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14. ABSTRACT
U.S. amphibious warfare began its development in the early 1900's, became a real capability in World War II, and today provides the nation with a means to achieve its policy objectives with an ability to project military power from the sea. During World War II, the first real test of this amphibious assault capability came at the beginning of the Central Pacific drive on Tarawa in 1943 and culminated with the final amphibious operation in the Pacific at Okinawa, some 350 miles south of mainland Japan. Ultimately, the U.S. military's tactics, techniques, and procedures for conducting amphibious operations in the Pacific theater during World War II became more efficient as the war progressed, largely due to an increased understanding of the requirements for success in the combat environment, and an emphasis on meeting and exceeding those needs.

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Tarawa to Okinawa: The Evolution of Amphibious Operations in the Pacific during World War II

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EXECUTIVE SUMMARY

Title: Tarawa to Okinawa: The Evolution of Amphibious Operations in the Pacific during World War II

Author: Major Andrew T. Noblet, USMC

Thesis: The U.S. military's tactics, techniques, and procedures for conducting amphibious operations in the Pacific theater during World War II became more efficient as the war progressed, largely due to an increased understanding of the requirements for success in the combat environment, and an emphasis on meeting and exceeding those needs.

Discussion: The development of the U.S. Marine Corps as an amphibious force began in the early 1900's. In its infancy the mission was to seize and defend advance naval bases in a benign environment in support of the fleet. However, its ability to seize an advance base against a defended objective did not become reality until World War II. The formation of the Fleet Marine Force in 1933 and the development of the *Landing Operations Doctrine, U.S. Navy 1938 (Fleet Training Publication 167)* paved the way for the transformation of the U.S. military as an amphibious assault force. On the eve of war the Navy, Marine Corps, and Army were all training to master this capability.

The first real test of the U.S. military's amphibious assault capability came at the beginning of the Central Pacific drive at Tarawa in 1943. At the conclusion of the hard fought assault on Betio Island, the Navy and the Marine Corps had proved that an assault on a ready, alert, prepared, and heavily defended beach could be successful. However, the price of this success was over 3,000 casualties. Tarawa provided many lessons learned for future amphibious operations, especially a better understanding of what it took to be successful in this kind of combat environment.

The final amphibious operation in the Pacific during World War II came at Okinawa, some 350 miles south of mainland Japan. This would be the largest amphibious operation in terms of personnel and equipment in the Pacific. It would also complete the evolution of the U.S. military's amphibious assault capability in terms of the scope of amphibious objectives and the size of an amphibious force, moving from a division sized operation against a small atoll at Tarawa to an assault force comprised of a numbered land army against a large and heavily defended island at Okinawa. This ultimately proved that the numerous changes in the tactics, techniques and procedures of amphibious operations throughout the war had forged the U.S. military's capability as amphibious warriors.

Conclusion: The U.S. military's capability to execute amphibious operations significantly improved throughout the course of three years of amphibious fighting in the Pacific during World War II, and that these improvements were largely a result of the lessons learned during their earlier operations and their ability to implement them.

TABLE OF CONTENTS

PREFACE

Over the last eight years the U.S. Marine Corps has been engaged in protracted land campaigns in Afghanistan and Iraq, mostly fighting as a counterinsurgency force alongside the U.S. Army. This in many ways has dulled its ability to execute its core function as a naval force, which is codified in U.S. Code-Title 10: "The Marine Corps shall be organized, trained, and equipped to provide fleet marine forces of combined arms, together with supporting air components, for service with the fleet in the seizure or defense of advanced naval bases and for the conduct of such land operations as may be essential to the prosecution of a naval campaign."[1]

Many of the Marine Corps' top leaders have voiced their concerns on the state of Navy and Marine Corps amphibious readiness. This includes General James T. Conway, Commandant of the Marine Corps, via Congressional testimony, comments to the media, and addresses to students at professional military education institutions. It is clear that the Marine Corps must continue to focus on improving and maintaining its amphibious capabilities, as well as training and preparing for the current counterinsurgency fight in Iraq and Afghanistan.

This project is intended to provide an historical analysis of the U.S. military's amphibious capability and adaptability, specifically those operations in the Central Pacific during World War II. My hope is that it will provide the reader some understanding of where our amphibious ambitions began, how they developed through World War II, and how some of the key lessons learned manifested into changes in tactics, techniques, and procedures that made our amphibious operations in the Pacific successful - even as the challenges associated with each changed and became more formidable. What will not be covered in this study is an analysis of the amphibious operations conducted in the European Theater, or the South and Southwest Pacific areas during World War II. However, some reference to early operations in the

Solomons will be made in order to help set the stage for the analysis of operations in the Central Pacific.

After reviewing the development of our amphibious capability prior to World War II, I shall conduct an analysis of the initial amphibious assault in the Central Pacific at Tarawa in 1943, and compare and contrast the significant similarities and differences with the final amphibious operation at Okinawa in 1945. My goal was to determine if the tactics, techniques, and procedures of the U.S. military changed throughout the course of the war in the Pacific Theater and, if so, what led to these changes.

Today's Marine Corps operations are categorized into six warfighting functions: Command and Control, Maneuver, Fires, Intelligence, Logistics, and Force Protection (per MCDP 1-0: Marine Corps Operations). Five of these functions will serve as the evaluation criteria for my analysis of the amphibious operations at Tarawa and Okinawa. I will compare and contrast the aspects of Command and Control, Intelligence, Fires, Maneuver and Logistics for each operation. An evaluation of the Force Protection measures and challenges will not be addressed separately, as much of what was done to protect the friendly force is embedded in the discussions of the other five functions.

I would like to acknowledge the guidance and assistance from my research advisor, Dr. Donald F. Bittner, as well as the support and patience of my wife, Cheryce, and our children.

INTRODUCTION

The use of the sea and naval forces to project combat power on land against a potential foe has been in practice for centuries. However, only since the development of weapons such as the machine gun, modern artillery, naval mines, and aircraft has the endeavor to assault an enemy defended objective from the sea required special doctrine, training and equipment. An early example of difficulties associated with conducting amphibious operations against a beach defended with modern weapons was the failed British attempt to take Gallipoli during World War I. The landing forces encountered numerous problems, due to inept leadership, lack of specialized training, insufficient artillery and aviation support, little or no naval gunfire support, a poor logistical footing, and command and control issues.[2] Ultimately, the force was withdrawn almost 10 months later after making little or no progress beyond securing its own beachhead areas. The failure at Gallipoli was enough to convince most army and naval planners of the day that conducting an amphibious assault against a defended beach was impossible. This became known as the Gallipoli complex, which the British adhered to going into World War II.

Even though the conduct of amphibious operations during this era may have been seen as impossible, the conversion of U.S. naval vessels to steam powered propulsion required advanced bases in support of the fleet. The importance of these advance bases was highlighted during the Spanish-American war as the U.S. fleet found itself engaging in operations throughout the Caribbean and Pacific. The conclusion of the war gave the U.S. additional territory in the Pacific, namely the Philippines and Guam. These new possessions along with its continuing presence in Hawaii and Samoa increased the strategic importance of the Pacific. Hence the U.S. needed to protect its interests in the Pacific with military power. Thus the ability to seize and

defend advanced bases in protection of their interests became an objective of the U.S. military, specifically the Navy and Marine Corps.

After 1905, the U.S. recognized the emergence of Japan as a military threat to its interests in the Pacific, and began formulating plans for a potential war against the Japanese Empire.[3] Japan had been assigned the color code name Orange by the Joint Army and Navy Board; thus the plans involving Japan were referred to as War Plan Orange.[4] A major impetus for the U.S. Marine Corps role in these war plans began with a document written in 1921 by Major Earl H. "Pete" Ellis, titled *Advanced Base Operations in Micronesia*, which detailed the assault and capture of bases in the Pacific, specifically on the Japanese mandated islands.[5] Once again the need for advanced bases to support the naval fleet surfaced as a critical requirement for the execution of these plans. This laid the foundation for the U.S. Marine Corps' efforts to solve the dilemma of successfully assaulting an objective defended with modern weapons against an attack from the sea.

The Japanese attack on Pearl Harbor in December 1941 and their subsequent conquest of most of the island countries in the Pacific would force the U.S. military to put their amphibious assault capabilities to the test throughout the Pacific theater of World War II. Since the U.S. military was not prepared to counter the Japanese threat immediately, it traded territory in the Pacific for time. This was used to expand its embryonic amphibious assault capability developed in the 1930's, mobilize and train its forces, and produce the required material and equipment to project its combat power against the Empire of Japan. The U.S. military's tactics, techniques, and procedures for conducting amphibious operations in the Pacific theater during World War II became more efficient as the war progressed, largely due to an increased

understanding of the requirements for success in the combat environment and an emphasis on meeting and exceeding those needs. This ultimately led to the U.S. victory in the Pacific.

EVOLUTION OF U.S. AMPHIBIOUS WARFARE CAPABILITY

Evolution of the U.S. Marine Corps as an Amphibious Force

The U.S. Marine Corps that became the fierce amphibious fighting force which successfully defeated the Japanese in the Pacific during World War II was not always tasked with performing amphibious assault duties. Its evolution as an amphibious force began after the turn of the century following the Spanish-American War. In April 1900, the General Board of the Navy recommended to the Secretary of the Navy that a force of Marines be organized and trained to seize and defend advanced bases in support of the fleet.[6] The U.S. Marine Corps' Advanced Base Force would be roughly battalion sized, consisting of four companies of Marines and officers, and would be kept at full strength, ready for immediate deployment.[7] By 1914 the Advanced Base Force had expanded to include two regiments on the East Coast, located in Philadelphia, and two regiments on the West Coast, located on Mare Island, just north of San Francisco. However, commitments in the Caribbean and Central America and the U.S. entry into World War I diverted large numbers of Marines away from their advanced base duties for service fighting small wars in the Caribbean and a major land campaign with the U.S. Army against Germany in Europe.

The post World War I era brought much internal debate as to what should be the focus of the Marine Corps' peace and war time missions. In February 1922, Major General John A. Lejeune, Commandant of the Marine Corps, wrote to the General Board of the Navy requesting that they approve the creation of a permanent force to effectively execute its primary war mission.[8] After pointing out the necessity of advanced naval bases in the event of a war in the

Pacific and the dire situation the fleet would find itself in the event of losing its base on Guam, he affirmed "the advantage of having immediately available a mobile Marine Corps force adequate to conduct offensive land operations against hostile naval bases."[9] The General Board agreed, and in November 1923 the Marine Corps Expeditionary Force was created consisting of the East Coast Expeditionary Force, located at Quantico, Virginia, and the West Coast Expeditionary Force, based in San Diego, California.[10] The Marine Corps Expeditionary Force replaced the Advanced Base Force with a permanently manned and equipped unit in theory available for service with the fleet.[11]

In reality, throughout most of its existence the Marine Corps Expeditionary Force found itself engaged in small wars in the Caribbean and service in China providing security, stability, and governance. Although some basic amphibious exercises were done in the 1920's, the Marine Corps Expeditionary Force's commitments elsewhere caused this training to be discontinued; this significantly reduced the Marine Corps' ability to focus on its mission of conducting landing operations in support of the fleet. In 1927, the Joint Board of the Army and Navy formally took up the issue of assigning service responsibilities to the Army, Navy and Marine Corps. The Marine Corps was to "provide and maintain forces for land operations in support of the fleet for the initial seizure of advanced bases and for such limited auxiliary land operations as are essential to the prosecution of the naval campaign."[12] Additionally, the board indicated that "the Marines...because of their constant association with naval units will be given special training in the conduct of landing operations."[13] By 1932 the Marine Corps' commitments to the small wars of the 1920's had ended, and it slowly began to focus on operations with the fleet.

However, one significant problem continually plagued the Navy and Marine Corps' attempts to advance its amphibious capability: the Marine Corps Expeditionary Force units were not permanently attached to the fleet, and therefore maintained a tenuous relationship with the Navy. In August 1933, Major General John H. Russell, Assistant Commandant, set out to correct this by advocating for the replacement of the Marine Corps Expeditionary Force with a new unit called the Fleet Marine Force, which would be included in the fleet organization under the tactical employment of the fleet Commander in Chief.[14] The recommendation was quickly approved by the Commandant and Chief of Naval Operations, and on 7 December 1933 Navy Department General Order 241 was signed creating the Fleet Marine Force. The next day Marine Corps Order 66 was issued establishing two brigades of equal strength, one stationed at San Diego, California for duty with the Pacific fleet, and the other at Quantico, Virginia for duty with the Atlantic fleet.[15] "This force provided the Navy with a 'type-force' of reinforced infantry with the specific mission of executing landing operations."[16] Now arose the real challenge: How to conduct such operations.

History of U.S. Amphibious Warfare Doctrine

During this time, the U.S. Marine Corps amphibious doctrine was gradually being developed and codified. Throughout the 1920's and 1930's, the Joint Army-Navy Board had released several documents concerning expeditionary operations overseas, with the latest version being released in January 1933, which included numerous problems and solutions for amphibious warfare planners.[17] This report, along with the early work of three officers at Marine Corps Schools (MCS) Quantico, Major Charles Barrett, USMC, Captain Pedro del Valle, USMC, and Lieutenant Walter Ansell, USN, would serve as the starting point for the Marine Corps' efforts to produce an official doctrine covering landing operations. Then, in November

1933, classes at MCS Quantico were suspended in order to allow the students and staff to form a working group with the task of drafting a landing operations manual. In January 1934, the products of this working group were submitted to a committee of some 70 officers from lieutenants to brigadier generals for review and revision, and by June 1934 the *Tentative Manual for Landing Operations of 1934* was complete.[18] The following year in May 1935 after continued refinement and revision, the manual was released as the *Tentative Landing Operations Manual*, which became the first widely distributed version.[19] This developmental process continued with a revision in 1937 and its publication as official doctrine in *Landing Operations Doctrine, U.S. Navy 1938 (Fleet Training Publication 167).* Subsequent to its release in 1938 three changes occurred: the first in May 1941 resulted from experience gained in training and developments in equipment, the second in August 1942 just before Guadalcanal, and the third in August 1943 as a result of the experiences from early landing operations of World War II.[20]

Training and Refinement of Amphibious Capability

The formation of the Fleet Marine Force and the development and publication of a landing operations doctrine led the Navy and Marine Corps to conduct fleet level training exercises to test the practicality of the theories published in their new doctrine. Training exercises between the Navy and Marine Corps were nothing new and had been conducted since the development of the Advance Base Force concept. Those early exercises conducted on Culebra Island during the winter of 1902-03, Grande Island, Philippines in 1904 and at Culebra in 1914 focused on the advanced base defense concept, which was characterized by a landing in a benign environment, the establishment of defenses ashore and then awaiting the enemy's reaction. After a long break, exercises were resumed at Guantanamo Bay and Culebra in 1922, and focused on the ship to shore movement of the 155mm gun and 10-ton tractor. During the

winter of 1923-24 exercises were conducted at Culebra and in the Canal Zone, focusing on island defense and landing operations. The following year in Hawaii another landing exercise was conducted. However, the Marine Corps' limited strength and commitments to small wars led to the discontinuation of the Marine Corps' participation in fleet exercises until the early 1930's.[21]

After another significant break in combined fleet exercises, training resumed in 1934, and between 1935 and 1941 a series of numbered fleet landing exercises (FLEXs) set out to test the new doctrine and equipment developed in support of landing operations. The FLEXs showed significant deficiencies in the application of the doctrine due to inadequate shipping and landing craft, naval gunfire and air support techniques, command and control procedures, communications equipment, and training.[22] (See Appendix D, for a detailed discussion on each exercise) Then, as the war in Europe intensified in 1941 and U.S. involvement became more likely, new commands were established within the Atlantic and Pacific fleets to conduct joint amphibious training for the Navy, Marine Corps and Army. Major General Holland M. Smith, USMC, led this effort on the east coast, and Major General Clayton B. Vogel, USMC, headed a similar unit on the west coast until his deployment as the commander of 1st Marine Amphibious Corps in August 1942, at which time General Smith assumed the joint training responsibilities for the west coast as well. These training programs were responsible for additional refinements to the landing operations doctrine, as well as the training of 1st and 2nd Marine Divisions, and 1st, 3rd, 7th, and 9th Army Infantry Divisions prior to their departures overseas.

From the beginning of these training exercises, new techniques and equipment were experimented with to determine their utility to advanced base and landing operations. Recognizing the need for the study and development of specialized equipment, the Commandant established the Marine Corps Equipment Board in 1933 to recommend equipment required to

execute the Marine Corps' mission. The most pressing equipment required to support landing operations were small landing craft for troops and supplies, lighters for tanks and vehicles, and an amphibious tank.[23] Private industry would eventually provide the military with the most effective solutions to these equipment shortages. By 1939, the Marine Corps was experimenting with a shallow draft troop landing craft developed by Andrew Jackson Higgins, and a tracked landing craft developed by Donald Roebling. Both of these craft would ultimately be modified to meet the needs of the military, and would be mass produced for employment throughout World War II; Higgins' landing craft would be designated Landing Craft Vehicle, Personnel (LCVP) and Roebling's would be called Landing Vehicle Tracked (LVT). After Tarawa, modified versions of the original LVT were armored and had weapons added. These vehicles were designated the LVT(A) and satisfied the Marine Corps' need for an armored amphibious vehicle that provided adequate force protection to the assault troops it transported, while providing fires on the beach. (See Appendix C, for photos and details on Amphibious Landing Craft) Additionally, Higgins' design for a tank lighter proved far better than competing designs and was adopted as the Landing Craft, Medium (LCM) used extensively throughout the war. The technical innovation of these three craft proved instrumental to the U.S. military's ability to execute amphibious operations during World War II.[24]

COMPARISON OF AMPHIBIOUS OPERATIONS

The initial U.S. response to counter the Japanese conquest of the Pacific came in the South and Southwest Pacific Areas beginning with operations in the Solomons in August 1942. As these operations achieved success and gained a foothold in the Pacific, a new offensive would be embarked upon through the Central Pacific.[25] The character of this offensive would be much different than that of the South and Southwest Pacific. Most of the target islands in the Central

Pacific did not allow the amphibious assault forces to land unopposed; hence operations there would require an assault into the heart of the Japanese defenses.[26] The amphibious operations of the Central Pacific drive highlighted the importance of effectively synchronizing the key components of amphibious assaults in order to overcome the defender. These eventually led to the perfection of the U.S. military's amphibious tactics, techniques and procedures. The Central Pacific drive would begin with an operation to gain control of the Gilbert Islands, and continue sequentially through the Marshalls, Marianas, Palaus, Bonins and finally Ryukyus.

Historical Background of Tarawa Amphibious Operations

The first major test of U.S. amphibious capability against a defended objective came on Betio Island within the Tarawa atoll of the Gilbert Islands. Tarawa was critical to the Japanese defense of the Gilbert Islands, and with its airfield and superior defenses Betio had to be secured in order to control Tarawa and the Gilberts in support future operations in the Marshall Islands.[27] The operation was assigned to 2d Marine Division and scheduled for 20 November 1943, in hopes of maximizing tidal waters over Betio's costal reef. The plan was to land 2d Regimental Combat Team, augmented by 2nd Battalion, 8th Marines, on the island's northern beaches, designated Red 1, Red 2, and Red 3, and assault across the island, then change direction and assault down the island's long axis eliminating all Japanese resistance.[28] This would be no easy task, with virtually every inch of the island covered by direct rifle and machine gun fire, an extensive obstacle network, almost 500 reinforced pillboxes, large caliber coastal defense guns, field artillery, light tanks, mortars, and an estimated 4,800 troops. Thus, Betio proved to be the most heavily defend island assaulted by allied forces in the Pacific during World War II.[29] The Japanese Commander of Tarawa, Rear Admiral Meichi Shibasaki, proclaimed, "a million Americans couldn't take Tarawa in 100 years."[30]

As the assault commenced, the landing force received tremendous fire from the beach defenses, pushing them off course and scattering the units all over the landing beaches. The Marines took heavy casualties, but managed to gain a foothold on the island. By nightfall, some 5,000 Marines had landed on Betio, of which approximately 1,500 were dead, wounded, or missing.[31] The Marines ashore prepared for a Japanese counterattack, which would have been devastating due to the tenuous position the Marines found themselves at the end of D-Day.

However, the Japanese were not able to organize a counterattack and as day two began additional reinforcements from 1st Battalion, 8th Marines, were landed on Red 2 – but only after wading ashore into the heart of Japanese machine gun fire and suffering more than 300 casualties. What was left of 1st Battalion, 8th Marines, was immediately ordered to attack to the west. Fighting throughout the morning secured the western end of the island and Green beach. Major General Julian C. Smith, Commanding General, 2d Marine Division, ordered the 6th Marine Regiment to land a battalion across Green beach, a battalion on the neighboring island of Bairiki, and prepare another battalion to land on Betio. By the end of the day momentum had shifted in favor of the Marines and the Japanese defenses began to crumble. That night General Smith ordered his Chief of Staff, Colonel Merritt A. Edson,[32] to go ashore and assume command of all forces on Betio and Bairiki, which by now consisted of eight reinforced rifle battalions and two artillery battalions.[33]

The next morning, D+2 (22 November 1943), Colonel Edson issued his attack orders: 1st Battalion, 6th Marines, would attack east from Green beach along the southern beach, 1st Battalion, 8th Marines, would attack west along the northern beach, and the remainder of 8th Marines would continue to attack east along the northern shore.[34] 1st Battalion, 6th Marines, made quick work of the Japanese defenses on the southwestern side of the island, and by mid-

day they had moved almost half way across the island. Additionally, 8th Marines units pushing east were finally able to destroy three strongpoints that had bogged down their eastern advance since D-Day. The eastern advance of these units continued during the afternoon, although at a much slower pace. By day's end, they had established defensive positions on the eastern end of the airfield. During the night the Japanese conducted numerous "Banzai" attacks on the Marines' defensive positions. Wave after wave of Japanese soldiers were cut down by rifle and machine gun fire leaving nearly 600 dead by morning.

At daybreak on D+3, the Marines resumed their attack east to eliminate all remaining resistance. On the other side of the island, the assault on the north shore's remaining strongpoints continued. The 3rd Battalion, 6th Marines, assumed the offensive to the east and eliminated more than 450 remaining Japanese defenders. Meanwhile, the combined attacks of 1st Battalion, 8th Marines, and 3rd Battalion, 2nd Marines, on the north shore eliminated the remaining strongpoints. By 1300 on 23 November 1943, organized resistance on Betio had been eliminated.

Historical Background of Okinawa Amphibious Operations

The final objective of the Central Pacific drive prior to the planned invasion of the Japanese mainland was the seizure Okinawa. The largest island in the Ryukyus chain, Okinawa was an excellent location for major military bases to support operations against the Japanese mainland. Only 350 nautical miles from southern Japan's Kyushu Island, it possessed numerous airfields and excellent locations for fleet anchorages.[35] The assault was scheduled for 1 April 1945, and would be led by Tenth Army, consisting of the 1st and 6th Marine Divisions of III Amphibious Corps securing the northern portion of the island, while the 7th, 96th and 77th Infantry Divisions of XXIV U.S. Army Corps secured the southern half of the island. In terms of

assets allocated, the Okinawa campaign would be the largest amphibious operation to date in the Pacific with more than 540,000 men, of which 183,000 were assault troops, and 1,200 naval vessels.[36] As the assault forces landed, they received only sporadic mortar and artillery fire causing very few casualties. The landing forces thus quickly established a beachhead and moved inland securing both Yontan and Kadena airfields. By 4 April the assault forces had crossed the island reaching its eastern coast, with the 6th Marine Division beginning its push to the north while XXIV Corps pushed to the south.

The Marines quickly gained ground to the north, meeting their only significant resistance on the Motobu Peninsula. By 21 April, the northern portion of the island had been secured, and the Marines had only to mop up minor pockets of resistance until they were relieved by 27th Infantry Division in May.[37] The Army, however, confronted significant opposition in the southern part of the island, as the Japanese had concentrated their defenses there. Three defensive lines had been developed, the first along Kakazu Ridge, the second further south near Shuri, and the last running east to west between Itoman and Gushichan.[38] Each of the lines maximized the use of terrain, and had been prepared with mutually supporting positions covering avenues of approach with machine gun, mortar and artillery fire.

After fighting through Kakazu Ridge, Tenth Army reorganized its forces in preparation for an assault on the Shuri line with the 1st and 6th Marine Divisions on the right, and the 77th and 96th Infantry Divisions on the left. The attacks on the Shuri line commenced on 11 May, and by the end of the month had forced the enemy to withdraw from his strongest defensive line. As Tenth Army continued its drive south surrounding the remaining Japanese forces, General Ushijima sent his final message to his troops on 19 June 1945, telling them "to fight to the last and die for the eternal cause of loyalty to the Emperor."[39] Three days later after 82 days of

fighting, Okinawa was declared free of organized resistance. The Japanese losses were immense, with 107,539 dead, an estimated 23,764 assumed sealed in caves or buried by the Japanese, and 10,755 captured.[40] While the U.S. casualty numbers were high on Okinawa, they were minuscule in comparison to the number of Japanese killed, missing, or captured. Tenth Army reported 7,374 dead, 31,807 wounded or injured, and 239 missing as a result of the fighting, and 26,221 non-battle casualties.[41] Okinawa demonstrated that an amphibious assault is a means to an end – to establish a beachhead and thence to breakout for subsequent operations ashore to defeat the enemy.

Command and Control

A key component to any military operation is the function of command and the commander's ability to exercise control over his forces. This control can be manifested in many ways, but first and foremost the command relationships within the assault force will dictate how and by whom control is achieved. Early amphibious operations on Guadalcanal gave the naval task force commander authority over operations ashore, which caused many problems and led the Marine Corps to lobby for a change. The Marine Commandant, Lieutenant General Thomas Holcomb, sought and gained the concurrence and approval from Admirals William Halsey, Chester Nimitz, and Ernest King that "the landing force commander should be on the same level as the naval task force commander and should have unrestricted authority over operations ashore."[42]

The Navy and Marine Corps agreed to implement this change following Guadalcanal. However, the command relationships for the landing forces on Tarawa only loosely followed the agreed to concept following Guadalcanal. Ultimately, the landing force commander was "to take independent command of their own forces, once they were established ashore, but their gunfire

support and logistics support and they, themselves, remained under the command of their respective Assault Task Commanders."[43] The V Amphibious Corps Commander, Major General Holland M. Smith, had virtually no authority over his forces ashore. His role was to "command the landing force; however, Admiral Spruance made directives issued by the general subject to the approval of Admiral Turner, since the employment of troops was governed by the capabilities of the surface units to land and support them."[44] This continued to be problematic for the Marine Corps, as the Navy was thought to be less concerned with support to the forces ashore as they were to the safety of their ships. By the assault on Okinawa this had clearly changed giving Lieutenant General Simon B. Buckner Jr., Commander, Tenth Army, authority over all landing forces once his headquarters had been established ashore, and making him responsible for the development and defense of the Ryukyus to the Commander in Chief Pacific Ocean Area, Admiral Nimitz.[45]

The Tarawa assault also highlighted numerous communications deficiencies which negatively impacted the control of movement and fires at all levels. The command ship for the Tarawa assault was the battleship USS Maryland (BB-46), which proved to be a poor choice. Concussions from its sixteen inch guns and its poorly designed and equipped radio network made communication between ship and shore nearly impossible. Also this directly impacted the landing of reserve forces and supplies as the operation developed. In some cases, these communications break downs led to the landing of forces into the heart of enemy fire causing extremely high casualties. The forces ashore also experienced numerous problems with their portable TBX and TBY radios due to water damage and short battery life. Following Tarawa, Rear Admiral Harry W. Hill commented that "the problem of ship to shore communications

could not be solved until specially designed command ships were introduced in the Central Pacific."[46]

The superior control of a much larger amphibious force during operations on Okinawa is evidence of the improvement in control procedures and communications capability. The introductions of amphibious assault command ships with enhanced communications equipment, refined ship to shore movement procedures, and control measures, as well as improved radio sets for units operating ashore were the result of lessons learned at Tarawa and proved critical to the success of future operations during the Central Pacific drive.

Intelligence

Most would agree that the collection and interpretation of vital intelligence in support of a military operation is paramount to the overall success of that operation, regardless if that operation is land based our sea based. Throughout the war in the Pacific, intelligence was a key factor in not only developing the strategic objectives for the destruction of Japan, but also the operational and tactical level plans to achieve those goals. The need for intelligence on the target islands was not a new concept to military planners, and the methods they used to gather that intelligence in support of the planning efforts remained for the most part consistent throughout the war (e.g., no new emerging techniques or procedures developed throughout the course of the war that significantly impacted the execution of amphibious operations).

However, it should be noted the collection and interpretation of intelligence varied based on the circumstance associated with each assault. In early October, while planning for the assault on Tarawa at Pearl Harbor, Major General Julian C. Smith, Commander, 2d Marine Division, was informed "that the enemy was considered capable of launching a combined air and submarine attack within three days after American ships arrived off the atoll."[47] This assessment

made surprise paramount to the force protection of the assault force, and significantly limited the recommended preparatory fires required to adequately reduce Betio's defenses. Ultimately, the Japanese were not able to carry out their planned counterattack of the Gilberts in any significant manner, due to the heavy losses of aircraft and surface vessels during the fighting in the Solomons and Bismarks.[48] The result was that the Japanese defenses on Betio were largely intact following the short preparatory bombardment, which led to high casualties among the landing force. Other than overestimating the Japanese ability to counterattack in the Gilberts, the work done gathering and interpreting intelligence in preparation for Tarawa was extremely thorough and valuable. The use of signals intelligence and the Allied decryption method, codenamed ULTRA, in the Gilberts proved effective in intercepting traffic leading to the sinking of the Japanese transport *Bangkok Maru* in late April; this prevented an eight hundred man Army battalion from reinforcing Tarawa.[49] Additionally, "the cryptologists ... produced valuable insights about the identity, size, and status of the Japanese garrisons."[50] The assault force hence benefited tremendously from the detailed photographs, accurate diagrams and disposition estimates of the Japanese defenses.

The interpretation of intelligence gathered in support of the assault on Okinawa proved to be less accurate. Although the landing forces received accurate information on the nature of the landing beaches in terms of beach and reef conditions, the information received on the disposition and location of the enemy defenses was less precise.[51] While U.S. intelligence accurately identified the major units within the Japanese defense, it estimated the Japanese strength to be between 53,000 to 56,000 troops, a significant underestimation of the more than 100,000 actually present.[52] U.S. forces experienced difficulty obtaining complete and accurate photo-reconnaissance of the island due to heavy cloud cover over Okinawa during aerial

reconnaissance missions.[53] Additionally, the U.S. photo-reconnaissance efforts were hampered by the Japanese ability to disguise their defenses in caves or underground.[54] Thus the pre-assault intelligence for Okinawa left the landing force without an accurate understanding "of the enemy's numbers, weapons, and disposition, or intelligence of his abilities."[55]

The result was a massive seven day bombardment of the landing beaches which produced little effect on the enemy, as his defenses were not located near the landing beaches. The assault forces landed expecting to meet heavy resistance on the beaches, as had been the norm in their previous assaults. However, they met no significant opposition. Ultimately, this breakdown in U.S. intelligence did not negatively impact the outcome of the operation on Okinawa, but it proved to be a significant miscalculation which led to over 5,000 tons and over 13,000 large caliber shells being fired during the preparatory bombardment with little or no damage done to the Japanese defenses.[56] As the operation progressed ashore, the lessons learned from the poor aerial photo support during the fighting in central and northern Okinawa led to changes in support of the forces fighting in southern Okinawa.[57] Thus, "the quality of the aerial photographic support was much better in the Southern Okinawa operation."[58] The result of the pre-assault intelligence for Okinawa was an unnecessary and ineffective naval bombardment campaign, which demonstrates the interrelation of the warfighting functions with regards to how intelligence impacted fires.

Fires

One of the basic differences of amphibious and land based assaults is the use of naval gunfire in place of field artillery to neutralize the enemy while friendly forces maneuver ashore. Significant change in the application of naval gunfire in support of amphibious operations occurred throughout the war in the Pacific, and lessons learned at Tarawa led to changes in how

and when these fires would be delivered in order to achieve maximum effect against the enemy. In fact, by the time the Okinawa invasion was executed the Japanese had come to the conclusion that defending the beach against an amphibious assault was futile due to the superior efficiency of U.S. naval gunfire.[59]

The expected result of naval gunfire at the beginning of the war was the neutralization of enemy defenses in order to enable landing forces to maneuver ashore.[60] The heavy defenses on Tarawa led planners to determine that destruction rather than neutralization had to be the goal of naval gunfire against the enemy's counter battery and reinforced strongpoints.[61] However, the short duration of time available for the preparatory bombardment led fires planners to follow a method of "saturating the island by target-areas in expectation that this would reduce all targets of importance."[62] This produced mixed results; although a massive amount of ordnance was fired on Betio, it did not achieve the desired effect leading fires planners to conclude that in future operations better trained fire support teams would need to execute a longer and more deliberate bombardment of enemy targets at close range, using proper ammunition and fusing for the target.[63] Analysis of subsequent operations in the Central Pacific drive shows that this lesson learned was applied in later operations, as the preparatory bombardment for the assault of Okinawa lasted seven days and focused on the destruction of enemy strongpoints. Although the pre-assault bombardment of Okinawa was of significant duration, it largely did not reduce the enemy's defenses. This led to several after action recommendations. Most notably, came the recommendation "that the period allocated for the preliminary bombardment be governed by results accomplished rather than by a fixed period of time; preferably delaying D-Day when necessary."[64] Also, in order to assess the effects of the bombardment, it was recommended "that a rapid method of assembling and disseminating destruction reports during the preliminary

bombardment phase be employed."[65] These recommended changes were proposed as a method in improving naval gunfire preliminary bombardment efficiency, as well as building the landing forces' awareness of what was left to oppose them once they hit the beach.

Equally important as the preparatory bombardment is the fire support plan during the ship to shore movement phase. Tarawa highlighted some key shortfalls in the execution of this phase. The fire support delivered while the assault elements moved ashore was based on predetermined start and stop times; this timetable approach did not account for the progress made by the assault elements towards the beach. Therefore, when the bombardment lifted at 0855 the Japanese had between fifteen to twenty-eight minutes to recover from the effects of the bombardment.[66] This enabled them to direct fire on the landing forces that landed between 0910 and 0923.[67] Although the initial assault waves were impacted by Japanese fire as they came ashore, the follow-on waves of Marines who were forced to wade ashore, due to the inability of their LCVPs to cross the reef, were devastated by Japanese fire from their beach defenses. Future assaults would closely monitor the movement progress of the lead waves in relation to the shore before lifting fires. As a result of improved fire support procedures and communications equipment, subsequent operations saw drastic improvements. For example, during the movement ashore on Okinawa, naval gunfire was never lifted but merely shifted to targets further inland maintaining a significant volume and rate of fire to suppress the enemy.

The use of aviation fires represents another essential fire support element to be brought against the enemy during an amphibious operation. Once again, Tarawa provided many lessons learned in the use of air support. The pre-assault bombing and strafing did little to effect the Japanese defenses due to its short duration and the relatively light bombs utilized. The poor results from the direct air support missions highlighted a need for better training amongst the

naval pilots and ground forces. This led Major General Holland M. Smith to lobby for Marine aviators to be assigned to escort carriers for support to future amphibious operations.[68] This would become a reality in the fall of 1944 when Marine squadrons began operating from carriers in support of the amphibious landings on Iwo Jima and Okinawa. Additionally, this would serve as the precursor of the Marine Air Ground Task Force (MAGTF) of today, which integrates a ground combat element, aviation combat element, and logistics combat element under a common commander responsible for the employment of Marine forces. Similar to the changes in naval gunfire procedures, it was learned at Tarawa that the assault phase air attack should correspond with the movement of assault elements to the beach and not limited to the pre-landing H-Hour. It was also determined that there was no need to lift naval gunfire during the air strikes. These changes were in practice during the assault on Okinawa, as air strikes ashore were incorporated with the rolling barrage from naval gunfire. As a result, the landing force benefitted from the added fire power of the aircraft and there were no casualties to aircraft from naval gunfire.[69]

The use of artillery fire to augment naval gunfire and aviation fires during amphibious operations also saw significant changes as U.S. amphibious skill grew. An essential element of the pre-assault operations for Okinawa was the capture of Keise Shima off the west coast of Okinawa. Once captured, the 420th Field Artillery Group went ashore and emplaced its 155mm guns. Extensive artillery fire from Keise Shima supported the pre-assault bombardment of targets on Okinawa, as well as provided fires on the landing beaches during ship to shore movement.

Artillery was not used in this manner during the amphibious assault on Tarawa. Although the 2d Marine Division planners for the Tarawa assault had hoped to seize Bairiki, off the eastern coast of Betio for use as an artillery position, their request was denied once it was

determined that the assault must achieve complete surprise.[70] The relatively ineffective pre-assault bombardment and the high U.S. casualties on Betio led military commanders to ensure that whenever possible artillery fire from an adjacent island would be used in support of future amphibious operations.[71] Thus, this technique was seen several times after Tarawa throughout the remainder of the Central Pacific drive.

Maneuver

The tactics, techniques, and procedures associated with the maneuver of U.S. amphibious forces both from the sea and while operating ashore also developed significantly over the course of the war in the Pacific. In some instances these changes were as a result of lessons learned from earlier operations, and others were due to the changing tactics the enemy employed in his defense. Regardless, the changes made to U.S. tactics, techniques, and procedures coupled with advances and availability in equipment strengthened U.S. maneuver capability.

A significant terrain feature of the islands targeted throughout the Central Pacific drive was the presence of coastal reefs around an objective; these would have to be crossed in order to move the landing force from ship to shore. This challenge was never more evident than during the assault on Betio Island in the Tarawa atoll. Here for the first time, LVTs were used as part of the assault waves to carry troops across the reef. Rear Admiral Richmond Kelly Turner opposed the use of LVTs for the Tarawa assault, but Major General Holland M. Smith forcefully demanded that they be acquired for use by the landing force, telling Admiral Turner, "No amtracks: no operation."[72] Admiral Nimitz agreed with Smith on the value of these vehicles, and 2d Marine Division was given 50 additional LVTs bringing the total available for use on Tarawa to 125.[73] The landing force only had enough LVTs to lift the first three waves across the reef, leaving the follow-on waves to be brought in by LCVPs. Unfortunately, the tidal water level on

D-Day did not rise high enough to allow the LCVPs to cross over the reef. Hence, the majority of the follow-on waves were forced to wade ashore leading to significant casualties.

The utility of the LVT as an assault craft had been proven, demonstrating its capability to negotiate coastal reefs while providing adequate force protection to the assault element. Never again would assault waves charge a defended beach without significant numbers of forces embarked in LVTs. Smith, who had fought for the use of LVTs at Tarawa, remarked in his memoir, "after Tarawa I made up my mind that all future landings would be spearheaded by amphibious vehicles."[74] By the time of the assault on Okinawa, landing forces would come ashore in hundreds of armored LVTs. In addition to the use of the LVT as an assault craft, the development and use of an amphibious 2½ ton truck, called the DUKW, significantly enhanced the amphibious force's ability to move its supplies and equipment ashore in support of the maneuver elements.

Along with the amphibious force's enhanced maneuver capability from ship to shore, changes in tactics to defeat the enemy while ashore led to changes in the standard equipment employed by maneuver forces against the enemy. The fighting on Tarawa centered on the tank-infantry team equipped with a relatively small number of light tanks and flamethrowers to defeat the enemy strongpoints. The ineffectiveness of the light tank's 37mm gun against fortified Japanese bunkers and the small numbers of flamethrowers available to the infantry teams led to the recommendation of using Sherman medium tanks during future operations and incorporating a flame thrower into every rifle platoon.[75]

The maneuver tactics on Okinawa centered on this enhanced tank-infantry team that was recommended following Tarawa. Thus, medium tanks, flame throwing tanks, and man portable flame throwers were instrumental in defeating the enemy defenses. Such teams operated in

much the same way on Okinawa as they did on Tarawa. However, on Okinawa the enemy used terrain, as well as caves and underground fortifications, to inflict significant losses on advancing U.S. infantry. The medium tank with its 75mm gun and flame throwing tanks with an effective range of 100 yards proved to be a well protected direct fire weapon that could destroy enemy forces in caves, bunkers and pillboxes, enabling the infantry's advance. Thus, using the tank as a mobile pillbox enhanced American force protection and was critical to the U.S. victory. The maneuver tactics and capabilities of this enhanced tank-infantry team overwhelmed the superior defensive positions of the Japanese on Okinawa leading General Ushijima to proclaim that "the enemy's power lies in its tanks. It has become obvious that our general battle against the American Forces is a battle against their...tanks."[76]

Logistics

An essential aspect of any military operation is the logistical capability to establish and sustain the force's combat power. Although it is clear that improvements were made in the logistical functioning of the amphibious forces throughout the course of the war in the Pacific, it is also clear that many of the logistical problems routinely faced were a result of the circumstances surrounding each operation.[77]

One logistical challenge that plagued both the Tarawa and Okinawa operations stemmed from shipping shortages and/or delayed shipping assignments. When this occurred, the landing force logistics sections were denied accurate data for the vessels they would be embarked upon. Obviously, this information was instrumental to developing load plans for the landing forces. During the planning phase for the Okinawa assault, "embarkation officers too often found that ships' characteristics data for assigned ships was incorrect or out of date; at times, it was either not furnished or unavailable."[78] Another factor that impacted the loading of shipping in support

of the Okinawa operation was the sheer size of the amphibious force; this required it to load its 433 assault transport and landing ships at eleven different ports spanning some 6,000 miles from Seattle to Leyte.[79] The Okinawa operation was also plagued by a general shortage of shipping and a delay in receiving ships as a result of operations in the Philippines and Iwo Jima.[80] This led to many ships being loaded to maximize space available, as evidenced by the comments of the commander of the transport group tasked with lifting 1st Marine Division: "It can be fairly stated that these ships were not combat loaded. All ships were, in the opinion of the squadron [TQM] commercial loaded, according to a definite priority."[81] Regardless of the challenges faced in both cases, it does not appear that off-loading operations were seriously impacted by problems encountered with the ships loading.

Tarawa exposed many problems with logistical planning and organization for amphibious operations against heavily defended objectives. The lessons learned from Tarawa helped pave the way for more efficient beach logistics operations. The logistical plan for Tarawa relied on the early establishment of a beachhead and the movement of supplies across the reef to the beach. The heavy opposition at the beach, however, denied the Marines a safe beachhead. Then, the problems encountered crossing the reef forced supplies to pile up in boats at the reef's edge. This was further compounded as the Navy unloaded supplies as quickly as possible instead of in order of precedence needed by the landing force.[82] In an attempt to fix this growing problem, an ad hoc system was put into place during the battle establishing a control and transfer point at the end of the pier. This limited the flow of supplies to the beach to only those items actually needed by the assault force.[83] Additionally, the control ship was tasked with allowing only those items needed ashore to proceed to the pier; later once some LVTs were assigned to the shore party, they began moving the supplies required by the assault force from the pier to the beach.[84]

Several logistical concepts for supporting amphibious operations resulted from these experiences at Tarawa. The idea of offshore control and transfer points to regulate the flow of supplies to the beach, as well as the concept of floating dumps of critical supplies waiting at the line of departure, emerged as common amphibious techniques.[85] Finally, it was determined that a more robust shore party was needed in order to organize and transport supplies to the assault elements, and that the troops performing these critical shore party duties would come from service units vice combat units.[86]

The evolution of these logistical techniques was demonstrated by the enormous amount of supplies and equipment moved ashore in support of the Okinawa operation. Although the assault forces were able to quickly establish a safe beachhead for the movement of supplies ashore, the shore parties performed excellently in keeping the assault forces well supplied throughout the operation. The task of unloading supplies on Okinawa fell to the division shore parties, which consisted of nearly 5,000 officers and men, and included a navy beach party, a joint assault signal company, military police, a motor transport detachment, and two naval construction battalions.[87] The elements of the shore party ensured that effective communication was maintained between the various command posts, supply dumps, and ships offshore; the control and movement of cargo in the beach area; and helped ensure traffic control around the beach and supply depots.[88] As testament to the success of these units, the offload in support of the Okinawa operation consisted of 458 ships, 193,852 personnel, and 312,795 short tons of cargo.[89] The tactics, techniques, and procedures of the logistical organizations supporting Okinawa had rapidly evolved in nearly two years. Even though they were still considered undermanned in relation to the scale of the support logistics units were providing, they had become a much more efficient organization.

CONCLUSION

It is clear to see that the U.S. military's capability to execute amphibious operations significantly improved throughout the course of three years of amphibious fighting in the Pacific during World War II. These improvements were largely a result of the lessons learned during their early operations and the ability to implement corrective measures associated with them. This process forged the U.S. military into a superior joint amphibious fighting force that accomplished military feats that had not been previously achieved. This joint amphibious force defeated the Japanese in every campaign from Guadalcanal in August 1942 to Okinawa in April 1945. The U.S. military's development as an amphibious fighting force culminated in the eventual Japanese surrender on 2 September 1945 aboard the USS Missouri (BB-63) in Tokyo Bay. As a result of the fighting throughout the Pacific in World War II, the U.S. military had completed the nearly fifty year evolution of its amphibious warfare capability.

In the 21st century, that ability to operate from the sea and project U.S. combat power is still a central theme of the *Marine Corps Vision and Strategy 2025*. One of the six U.S. Marine Corps' Core Competencies states, "The Corps conducts joint forcible entry operations from the sea and develops amphibious landing force capabilities and doctrine."[90] U.S. amphibious warfare began its development in the early 1900's, became a real capability in World War II, and today provides the nation with a means to achieve its policy objectives with an ability to project military power from the sea.

Appendix A: Chronology of Events: Central Pacific Drive[91]

1941

9-Dec	Japanese occupy Tarawa and Makin Islands in Gilberts.
10-Dec	Guam surrenders to Japanese landing force.
23-Dec	Wake Island surrenders to Japanese.

1942

1-Feb	U. S. carrier task forces raid Japanese positions in Gilberts and Marshalls.
30-Mar	Pacific Ocean divided into Pacific Ocean Areas under Adm Nimitz, and Southwest Pacific Area under Gen MacArthur.
4-8May	Battle of the Coral Sea.
4-6Jun	Japanese are decisively defeated in main Battle of Midway.
7-Aug	1st MarDiv lands on Guadalcanal and Tulagi to launch first U. S. offensive of the war.
17-Aug	2d RdrBn lands from submarines at Makin Island. Raid is completed following day.
20-Aug	Marine aircraft arrive on Henderson Field, Guadalcanal.
2-Oct	5th DefBn occupies Funafuti, Ellice Islands.

1943

14-23Jan	Casablanca Conference to determine strategy for 1943. Agreement reached to advance toward Philippines through Central and Southwest Pacific, and to terminate hostilities only upon "unconditional surrender" of the enemy.
8-Feb	Japanese complete evacuation of over 11,000 troops from Guadalcanal.
9-Feb	Organized resistance on Guadalcanal ceases.
21-Feb	Army troops, reinforced by Marine raiders and antiaircraft units, seize Russell Islands without opposition.
2-5Mar	Battle of Bismarck Sea. U.S. and Australian aircraft bomb Japanese destroyers and troop transports enroute to Lae, New Guinea.
15-Mar	Central Pacific Force redesignated Fifth Fleet; South Pacific Force becomes Third Fleet.
26-Apr	General MacArthur issues ELKTON III, superseding previous ELKTON plans. Plan calls for mutually supporting advances in South Pacific and Southwest Pacific Area toward Rabaul, Operation CARTWHEEL
12-25May	TRIDENT Conference held in Washington. General approval given to "U.S. Strategic Plan for the Defeat of Japan" calling for drive on Japan through Central Pacific.
21-Jun	Elements of 4th RdrBn open Central Solomons campaign with landing at Segi Point, New Georgia.
14-24Aug	QUADRANT Conference in Quebec. CCS decides to attack Japan along both Central and Southwest Pacific routes.
4-Sep	VAC formed under command of Maj Gen Holland M. Smith to train and control troops for amphibious landings in Central Pacific.
15-Sep	2d MarDiv is formally assigned to VAC.
19-Sep	TF 15 and Seventh Air Force launch coordinated attacks against Tarawa.
20-Sep	4th MarDiv assigned to VAC.

24-Sep	VAdm Raymond A. Spruance recommends an amphibious operation against Makin.
5-Oct	CinCPac-CinCPOA issues plan for offensive in Central Pacific. D-Day for landings in Gilberts set for 19Nov43, later postponed to 20Nov.
13-Oct	Photographic coverage of Makin Atoll obtained.
20-Oct	Photographic coverage of Tarawa obtained.
25-Oct	VAdm Spruance issues operation plan for GALVANIC, Gilberts Operation.
31Oct-7Nov	Northern Attack Force (TF 52) rehearses for GALVANIC off Hawaii. Southern Attack Force (TF 53) rehearses at Efate, New Hebrides.
1-Nov	IMAC lands on Bougainville with 3d and 9th Marines and 2d RdrRegt in assault.
10-Nov	Main body of Northern Attack Force for GALVANIC leaves Pearl Harbor.
12-Nov	Southern Attack Force completes rehearsal and departs from New Hebrides.
19-Nov	Final air bombardment of Gilberts, Marshalls, and Nauru in preparation for Gilberts invasion.
20-Nov	VAC assault troops, 2d MarDiv at Tarawa and elements of 27th InfDiv at Makin, make landings in the Gilberts. Tarawa landings successful despite heavy casualties.
21-Nov	Marines on Tarawa strengthen their hold on island. VAC ReconCo lands on Apamama Atoll.
22-Nov	MajGen Julian Smith establishes CP on Tarawa.
22 Nov-7Dec	SEXTANT Conference held at Cairo. Tentative timetable for offensive against Japan established.
23-Nov	End of organized resistance on Tarawa and Makin.

1944

3-Jan	Joint Expeditionary Force (TF 51 under RAdm Turner) issues operation plan for FLINTLOCK, assault on Marshalls.
13-Jan	CinCPac-CinCPOA Campaign Plan GRANITE outlines tentative operations and timetable for Central Pacific offensive. Main body of TF 53 departs San Diego.
22-Jan	Main body of FLINTLOCK attack force sail from Hawaii for Marshalls.
23-Jan	Attack force reserve for FLINTLOCK and Majuro Attack Group sail for target.
29-30Jan	Carrier planes and naval vessels join in final neutralization of Marshalls.
31-Jan	VAC assault troops seize small islands of Kwajalein Atoll as artillery positions for main landing support. VAC ReconCo secures Majuro Atoll.
1-Feb	4th MarDiv lands at Roi-Namur and 7th InfDiv at Kwajalein Island.
2-Feb	7th InfDiv troops meet increased resistance. 4th MarDiv completes mop-up of Roi and capture of Namur.
4-Feb	7th InfDiv completes capture of Kwajalein Island. RAdm Harry W. Hill given command of Task Group 51.11 with the mission of seizing Eniwetok Atoll.
7-Feb	4th MarDiv concludes uneventful search of islands of northern Kwajalein Atoll.
15-Feb	Eniwetok Expeditionary Group (TG 51.11 under RAdm Hill) leaves Kwajalein for Eniwetok.
17-Feb	Tactical Group 1, VAC, begins landing in Eniwetok Atoll (Operation CATCHPOLE).
18-Feb	22d Marines (reinforced) secure Engebi.
19-Feb	Elements of 27th InfDiv and 22d Marines land on Eniwetok Island.
21-Feb	Capture of Eniwetok Island completed.
22-Feb	22d Marines assault and secure Parry.

12-Mar	JCS direct seizure of Southern Marianas, target date 15Jun44.
20-Mar	4th Marines seize Emirau in the Bismarcks. Adm Nimitz issues FORAGER Joint Staff Study setting forth the purpose of the Marianas operation.
26-Apr	Expeditionary Troops operation order states mission " . . . to capture, occupy, and defend Saipan, Tinian, and Guam. . . ."
17-19May	Northern Troops and Landing Force maneuvers and rehearses at Maui and Kahoolawe, Hawaiian Islands.
25-May	LSTs carrying assault elements of the 2d and 4th MarDivs depart Pearl Harbor.
29-30May	Portion of the Northern Troops and Landing Force not embarked in LSTs departs Pearl Harbor.
11-Jun	Carrier planes of TF 58 begin preinvasion softening of Marianas. Northern Attack Force departs Eniwetok for Saipan.
13-Jun	TF 58 continues aerial bombardment of Marianas and begins naval bombardment.
14-Jun	VAC assault troops approach Saipan. Underwater demolition and minesweeping operations conducted along coast.
15-Jun	2d and 4th MarDivs land on Saipan.
16-Jun	VAdm Spruance postpones landing on Guam because major naval battle appears imminent. Naval surface forces begin preinvasion bombardment of Guam. Elements of 27th InfDiv land on Saipan during night 16-17Jun44. Japanese launch strong, unsuccessful, tank-infantry night attack against 6th Marines.
18-Jun	4th MarDiv drives to east coast of Saipan, cutting island in two. 27th InfDiv captures Aslito airfield.
19-Jun	4th MarDiv begins clearing northern part of Saipan. 27th InfDiv troops to clear Nafutan Point and south coast of Saipan.
19-20Jun	Battle of the Philippine Sea. Carrier aircraft of TF 58 engage planes from enemy carriers and inflict crippling losses.
22-Jun	VAC attacks northward on Saipan.
24-Jun	2d Marines reach outskirts of Garapan.
30-Jun	Commanders' conference on Saipan decides landings on 21Jul44. Conclusion of battle for central Saipan.
2-Jul	2d Marines seize Garapan. Japanese fall back to final defense line in northern Saipan.
6-Jul	Southern Attack Force begins naval bombardment of Guam.
9-Jul	Saipan declared secure. Japanese garrison of about 22,000 is virtually destroyed.
12-Jul	FMFPac activated with LtGen Holland M. Smith as commander.
14-Jul	Joint Staff Study for Operation STALEMATE (invasion of the Palaus) issued.
20-Jul	Volume of aerial attacks against Guam reaches peak. Naval bombardment continues. Preinvasion air and naval bombardment of Tinian also in progress.
21-Jul	IIIAC assault troops land on Guam. 3d MarDiv and 1st ProvMarBrig push inland and by nightfall hold two beachheads. Elements of 77th InfDiv also go ashore.
22-Jul	Softening up of Tinian continues. Marines repel counterattacks on Guam and continue advance inland.

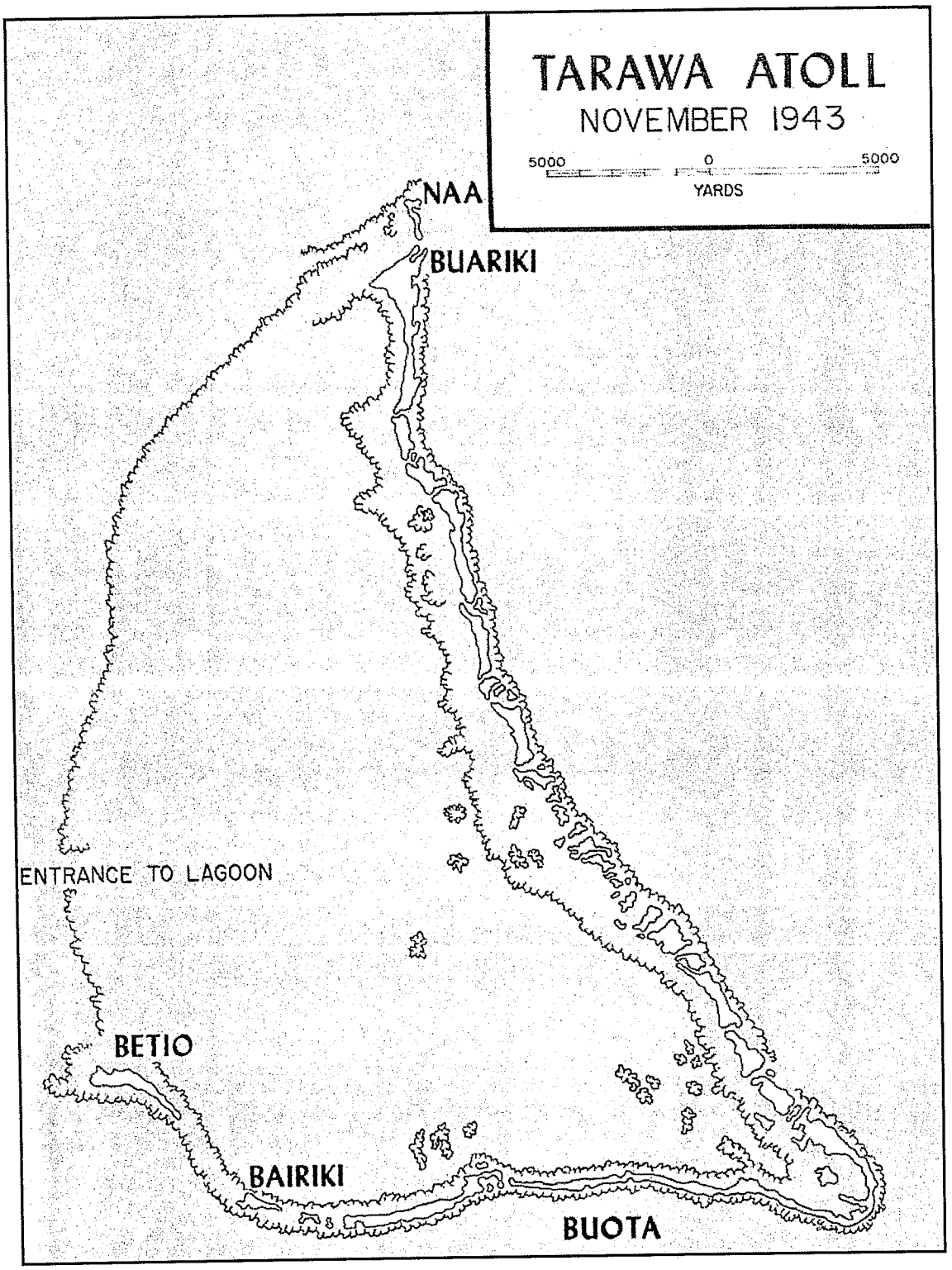
24-Jul	4th MarDiv lands on Tinian and secures beachhead.
25-Jul	4th MarDiv expands beachhead on Tinian. Japanese unsuccessfully counterattack IIIAC positions on Guam.
26-Jul	2d MarDiv lands on Tinian. 1st ProvMarBrig opens attack to clear Orote Peninsula on Guam.
28-Jul	Marines on Tinian continue rapid advance against light resistance from retreating enemy.
30-Jul	Marines capture Tinian town and compress Japanese into southern tip of island. MajGen Geiger issues orders for pursuit of enemy northward on Guam.
1-Aug	Organized enemy resistance ends on Tinian.
10-Aug	End of organized Japanese resistance on Guam, though hundreds of Japanese remain to be mopped up.
15-Aug	IIIAC, having completed its operations in the Marianas, is committed to invasion of the Palaus.
15-Sep	JCS decide to invade Central rather than Southern Philippines and advance target date for invasion of Leyte from 20Dec to 20Oct44. 1st MarDiv lands on southwest shore of Peleliu Island.
17-Sep	81st InfDiv, as part of IIIAC, lands on Angaur.
30-Sep	Peleliu, Angaur, Ngesebus, and Kongauru declared occupied.
9-Oct	Third Fleet bombards Marcus Island.
14-Oct	VAC directed to prepare plans for Iwo Jima operation.
20-Oct	U. S. Army troops invade Leyte.
24-26Oct	Battle of Leyte Gulf which ends in U. S. naval victory.
25-Nov	CinCPOA issues operation plan for invasion of Iwo Jima. Tentative date 3Feb 45.

1945

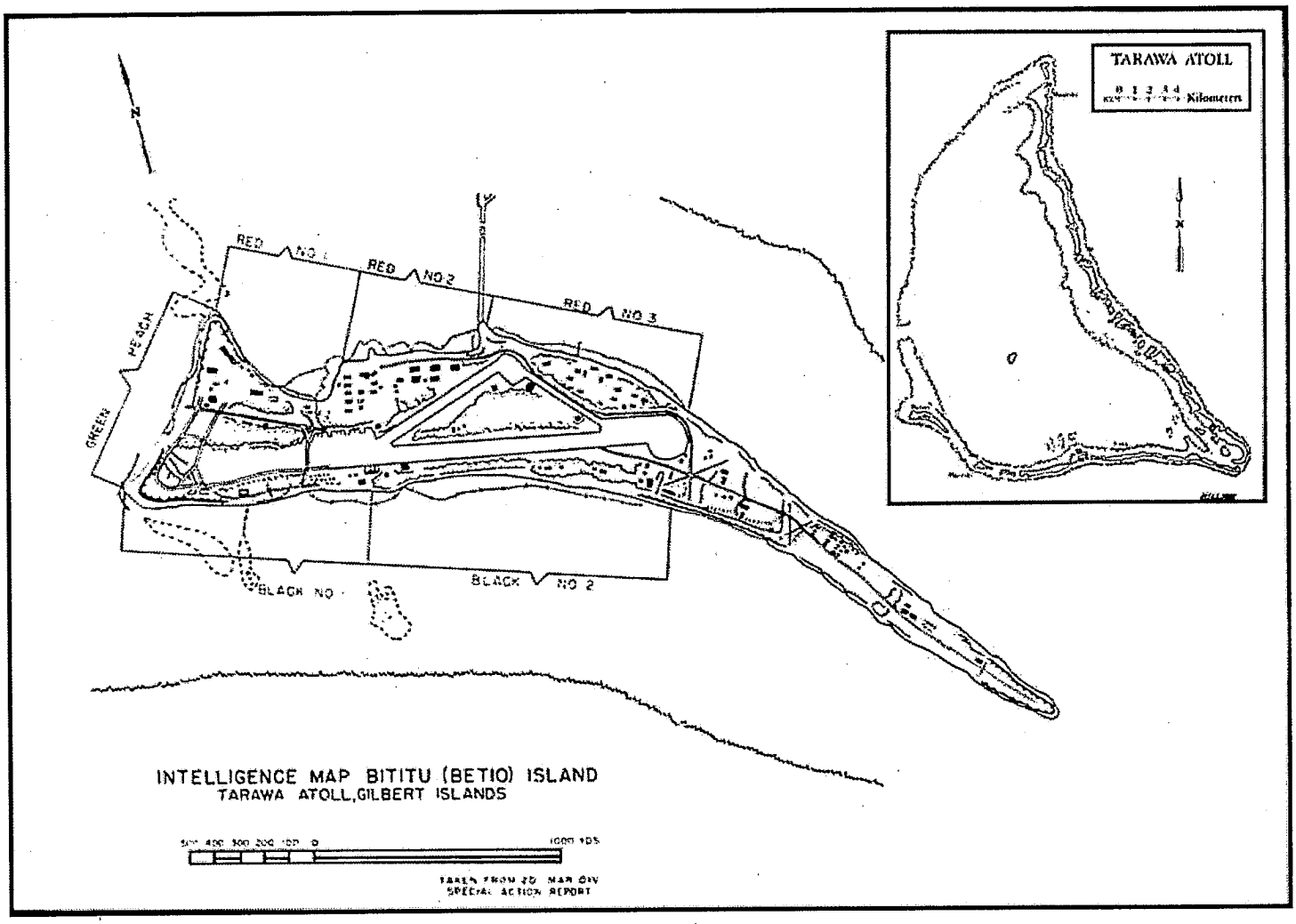
9-Jan	Sixth Army invades Luzon.
13-Feb	Final rehearsals for Iwo Jima operation concluded off coast of Tinian.
19-Feb	Assault troops of VAC land on Iwo Jima.
26-Mar	End of Japanese resistance on Iwo Jima.
1-Apr	Tenth Army, including IIIAC, lands on Okinawa.
7-Apr	Battle of East China Sea. Japanese fleet units heading toward Okinawa are intercepted by planes of TF 58.
25-May	JCS direct invasion of Japan, scheduled for 1Nov45.
14-Jun	JCS order commanders in Pacific to prepare plans for immediate occupation of Japan.
22-Jun	End of organized resistance on Okinawa.
16-Jul	Atomic bomb successfully tested at Los Alamos, New Mexico.
6-Aug	Tinian-based B-29 drops atomic bomb on Hiroshima.
9-Aug	Tinian-based B-29 drops atomic bomb on Nagasaki. Russia invades Manchuria.
12-Aug	Soviet troops move into Korea.
15-Aug	Offensive action against Japan halted.
30-Aug	4th Marines go ashore at Yokosuka. Army troops land at Atsugi airfield.
2-Sep	Japanese sign instrument of surrender in Tokyo Bay.

Appendix B: Maps:

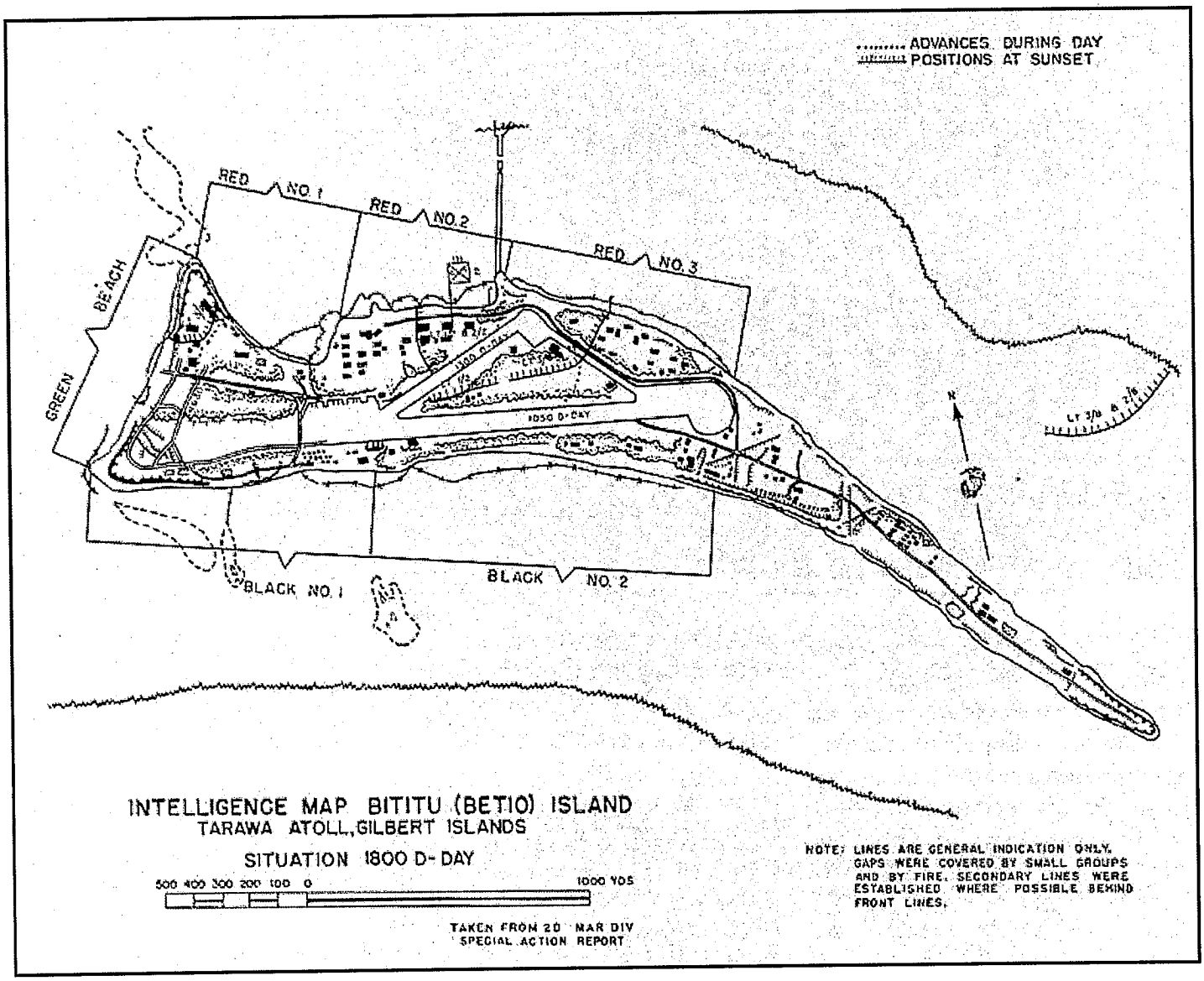
Tarawa Atoll[92]



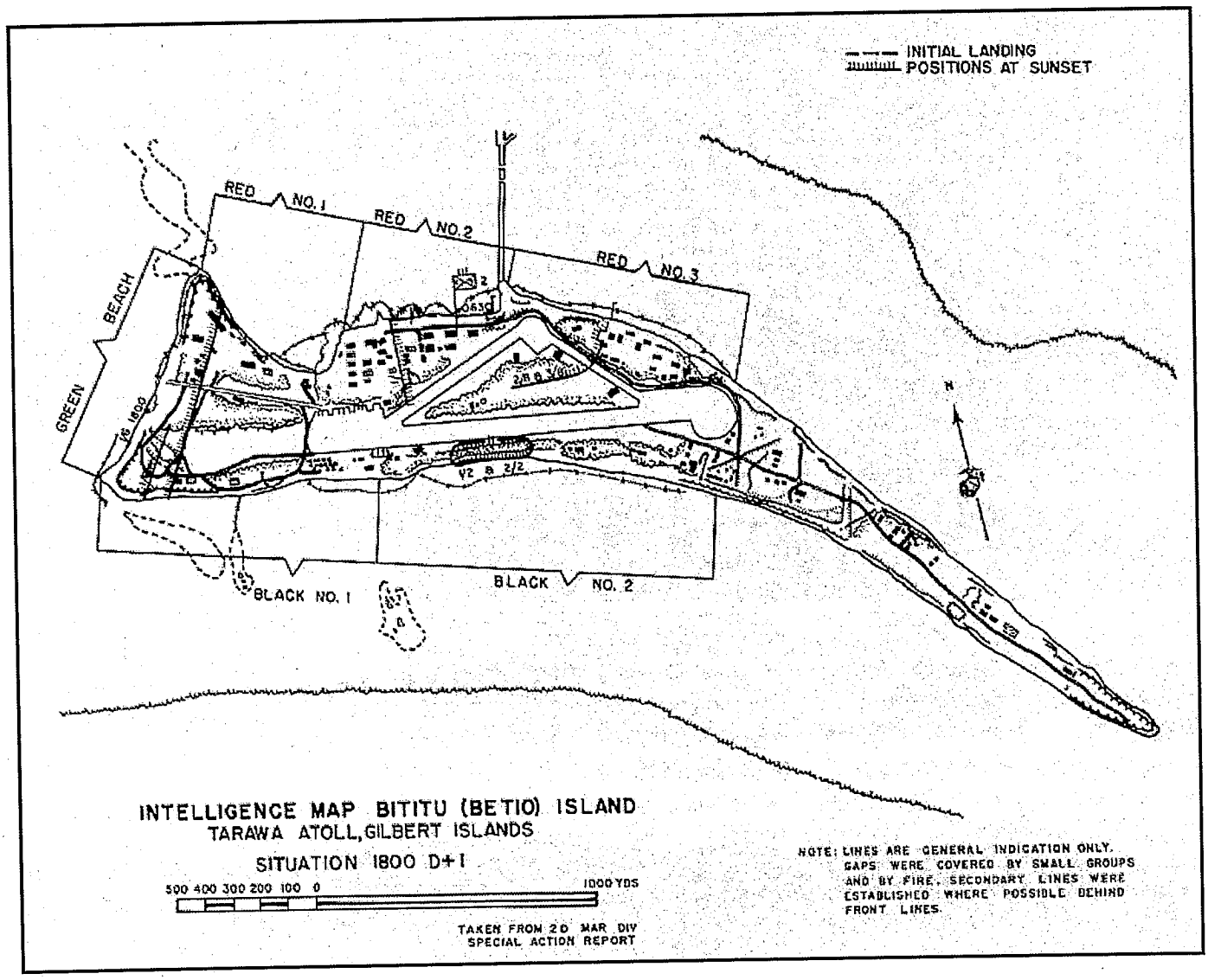
Tarawa Landing Beaches[93]



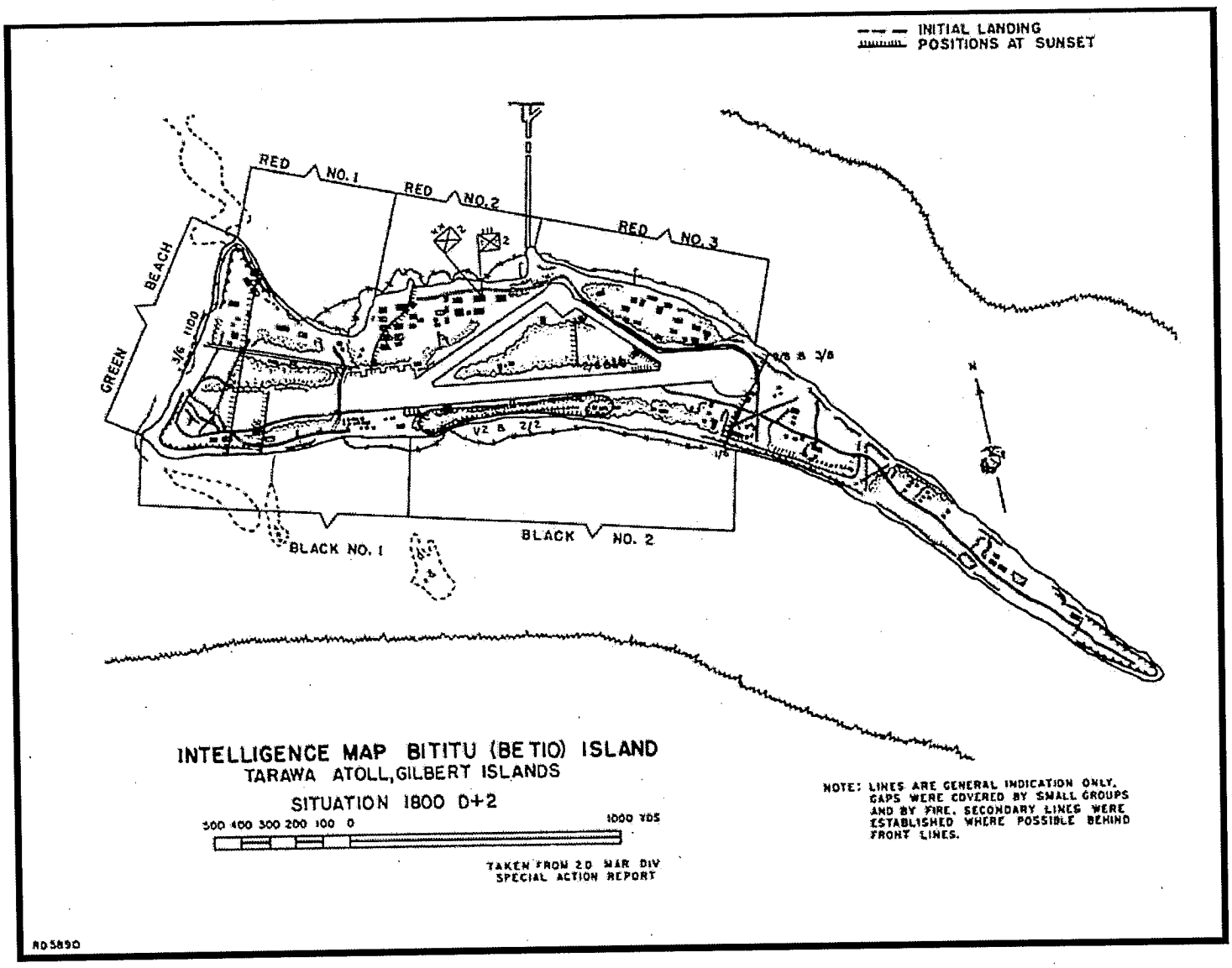
Tarawa: D-Day (1800)[94]



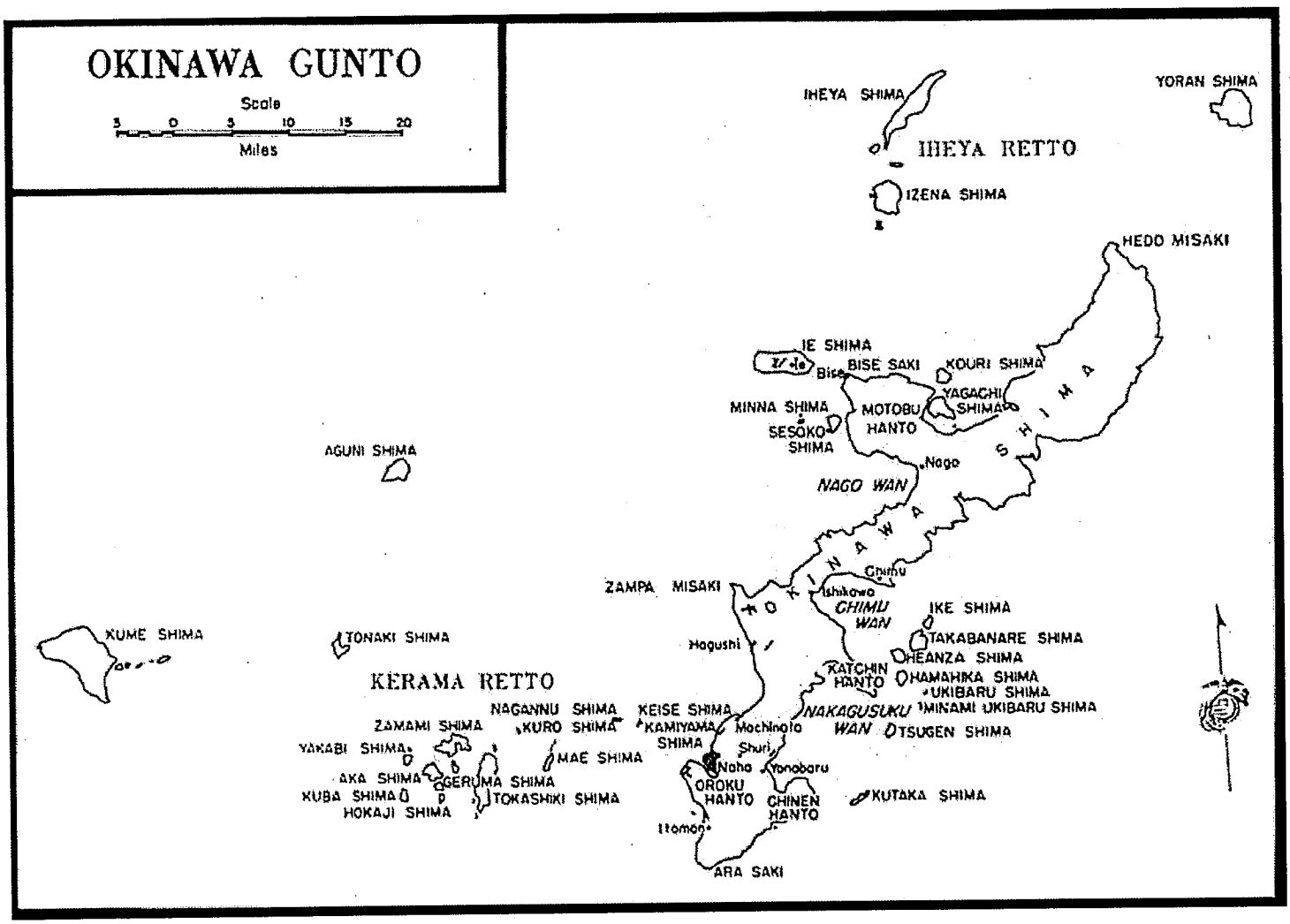
Tarawa: D+1 (1800)[95]



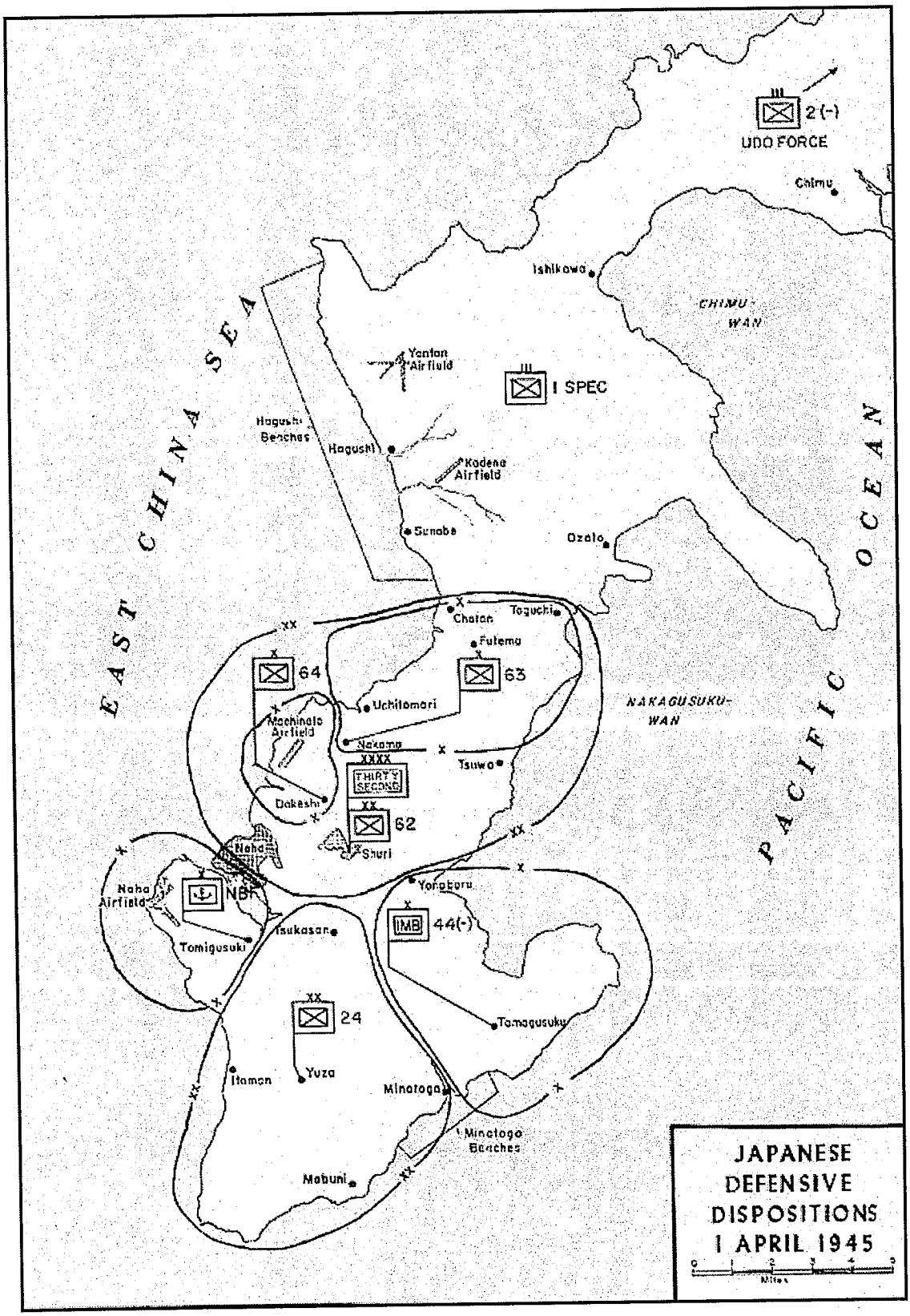
Tarawa: D+2 (1800)[96]



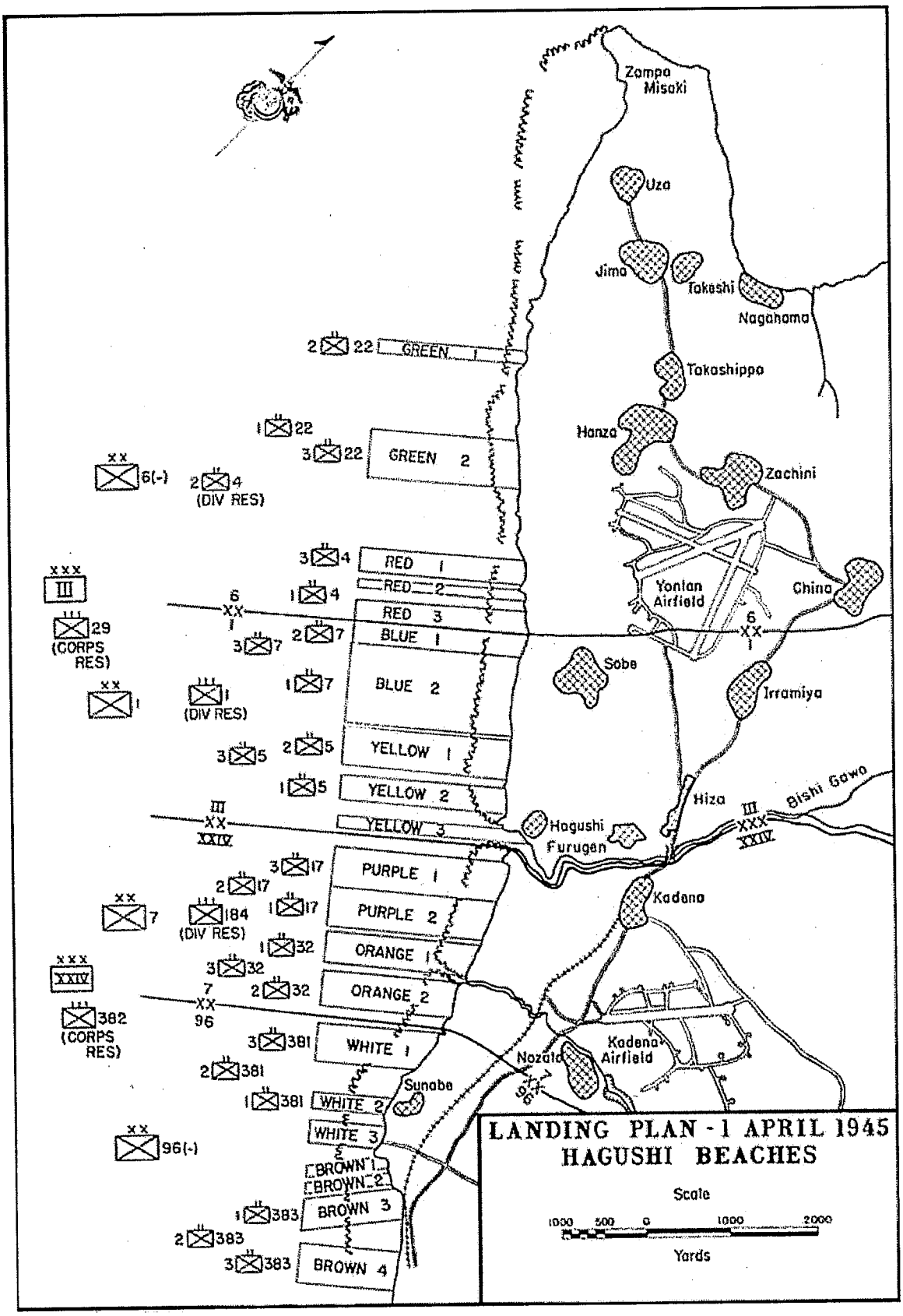
Okinawa[97]


OKINAWA GUNTO
Scale
5 0 5 10 15 20
Miles
IHEYA SHIMA
IHEYA RETTO
YORAN SHIMA
IZENA SHIMA
HEDO MISAKI
IE SHIMA
Ie
BISE SAKI
Bise
KOURI SHIMA
YAGACHI SHIMA
MINNA SHIMA
SESOKO SHIMA
MOTOBU HANTO
AGUNI SHIMA
Nago
NAGO WAN
OKINAWA SHIMA
Chinu
ZAMPA MISAKI
Ishikawa
CHIMU WAN
IKE SHIMA
TAKABANARE SHIMA
HEANZA SHIMA
KUME SHIMA
TONAKI SHIMA
Hagushi
KERAMA RETTO
KATCHIN HANTO
HAMAHIKA SHIMA
UKIBARU SHIMA
MINAMI UKIBARU SHIMA
NAGANNU SHIMA
KEISE SHIMA
KURO SHIMA
KAMIYAMA SHIMA
Mochinoto
NAKAGUSUKU WAN
TSUGEN SHIMA
ZAMAMI SHIMA
YAKABI SHIMA
MAE SHIMA
Shuri
Naha
Yonabaru
AKA SHIMA
GERUMA SHIMA
KUBA SHIMA
TOKASHIKI SHIMA
OROKU HANTO
CHINEN HANTO
KUTAKA SHIMA
HOKAJI SHIMA
Itoman
ARA SAKI

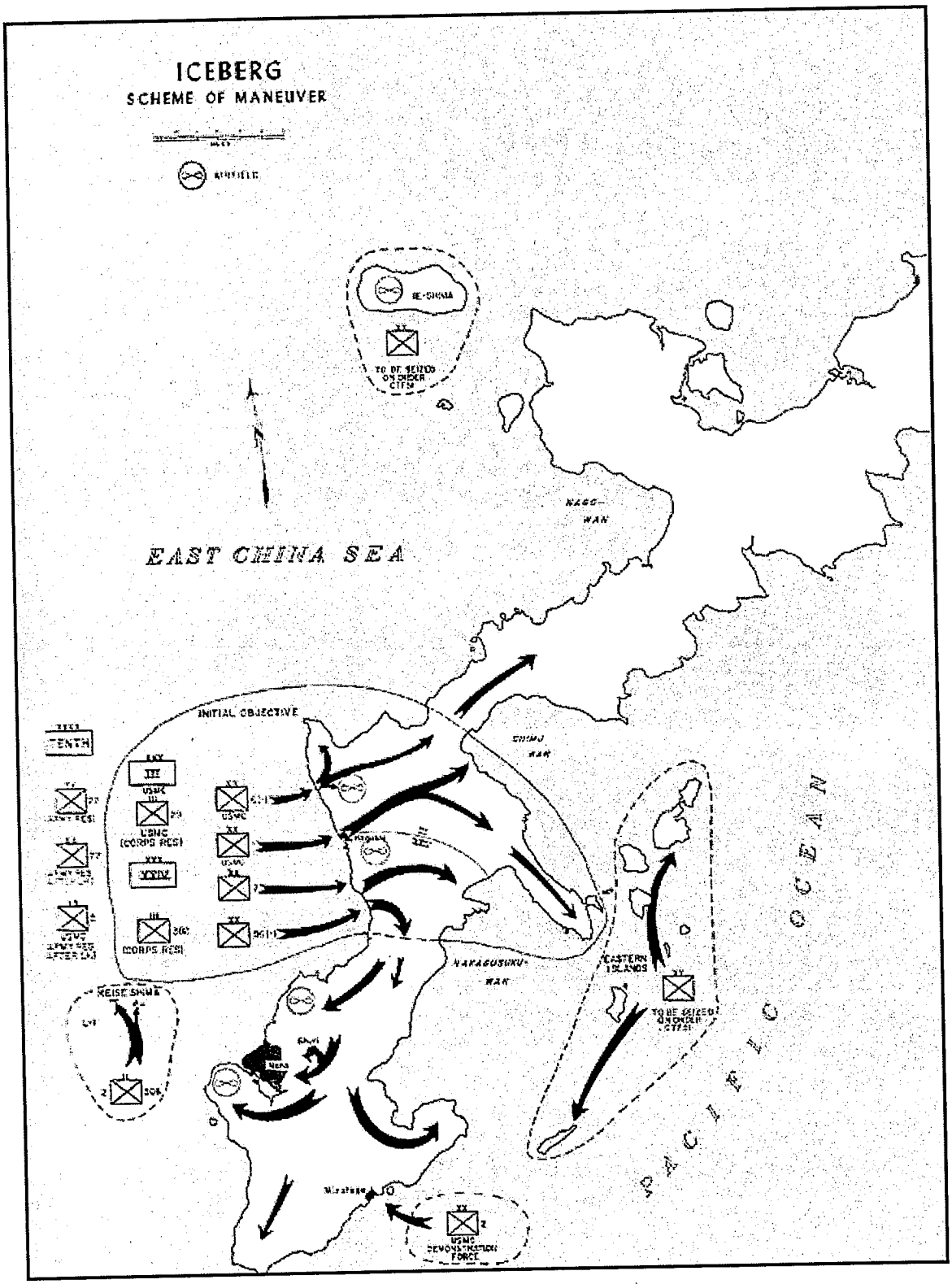
Okinawa: Japanese Defenses 1 April 1945[98]



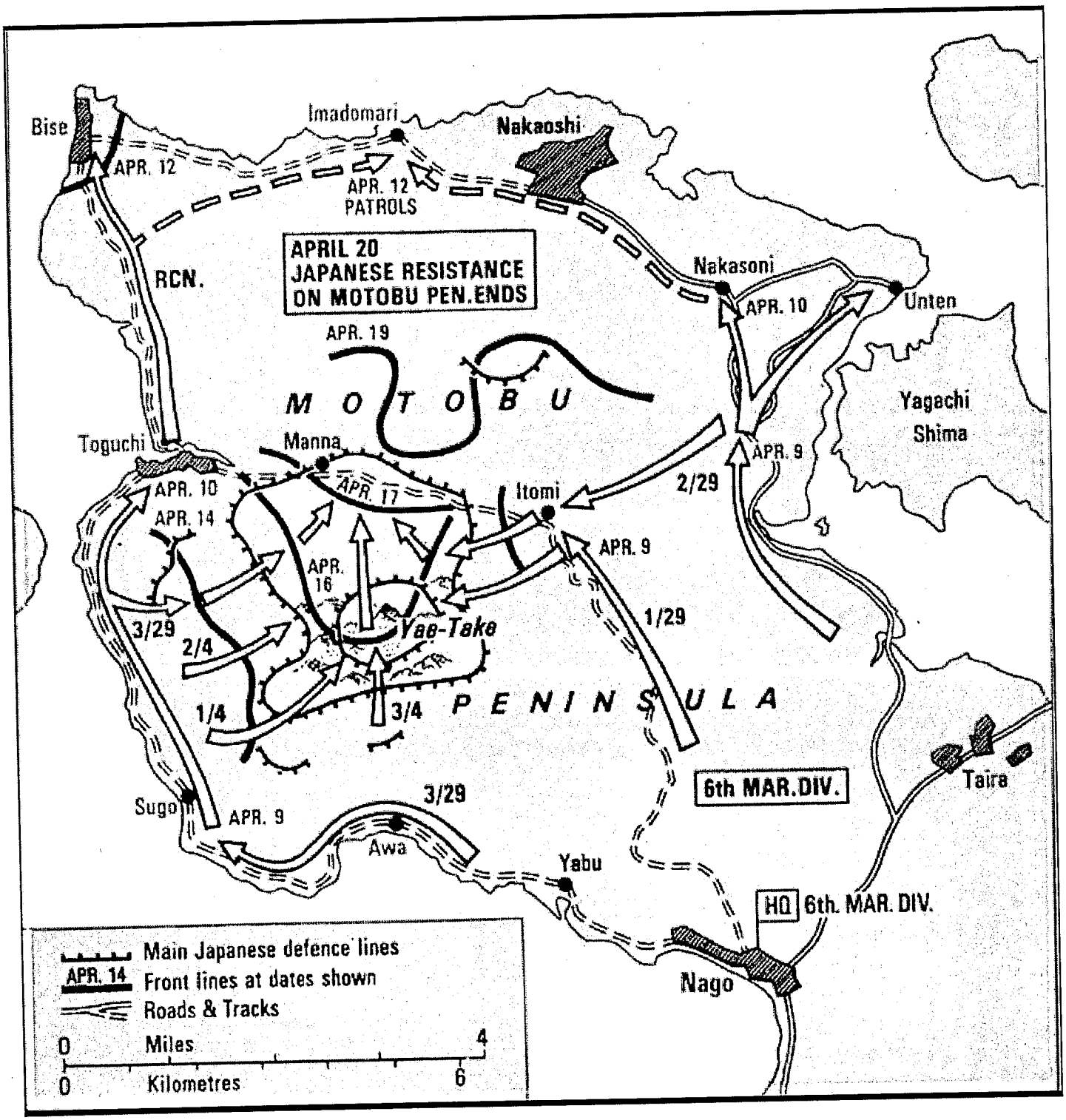
Okinawa: U.S. Landing Plan[99]



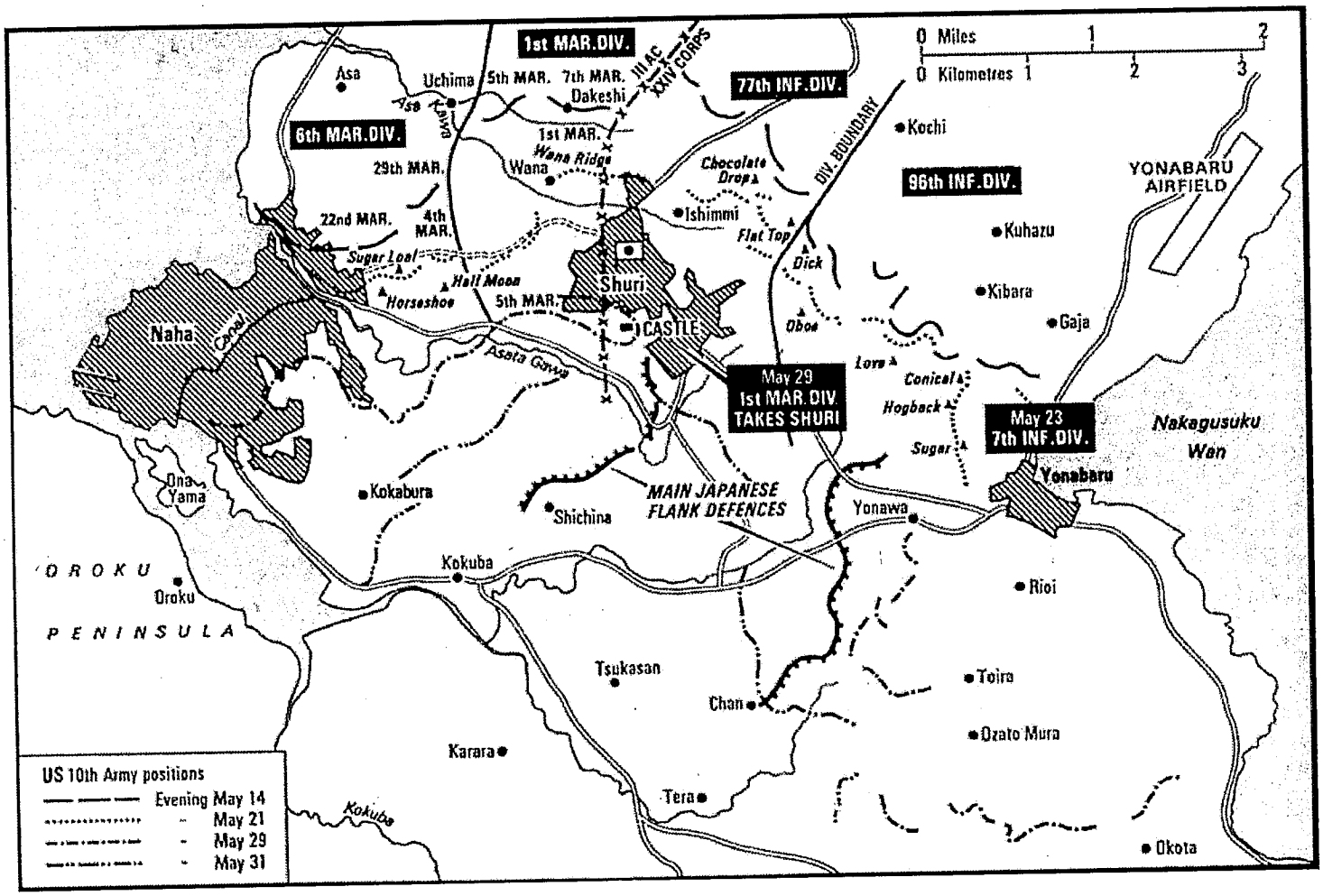
Okinawa: U.S. Scheme of Maneuver[100]



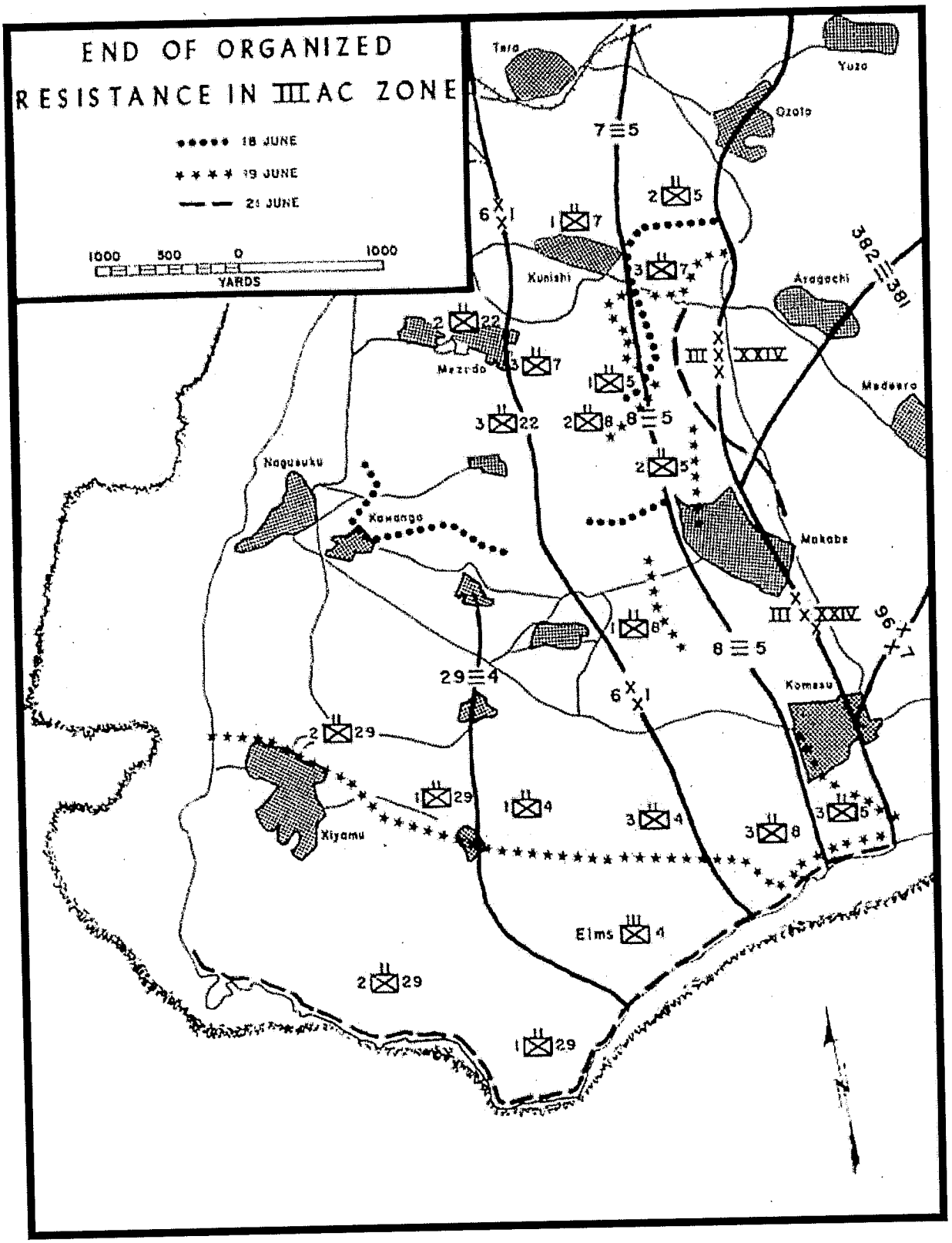
Okinawa: 6th Marine Division Eliminates Resistance in the North[101]



Okinawa: Assault on Shuri Line[102]



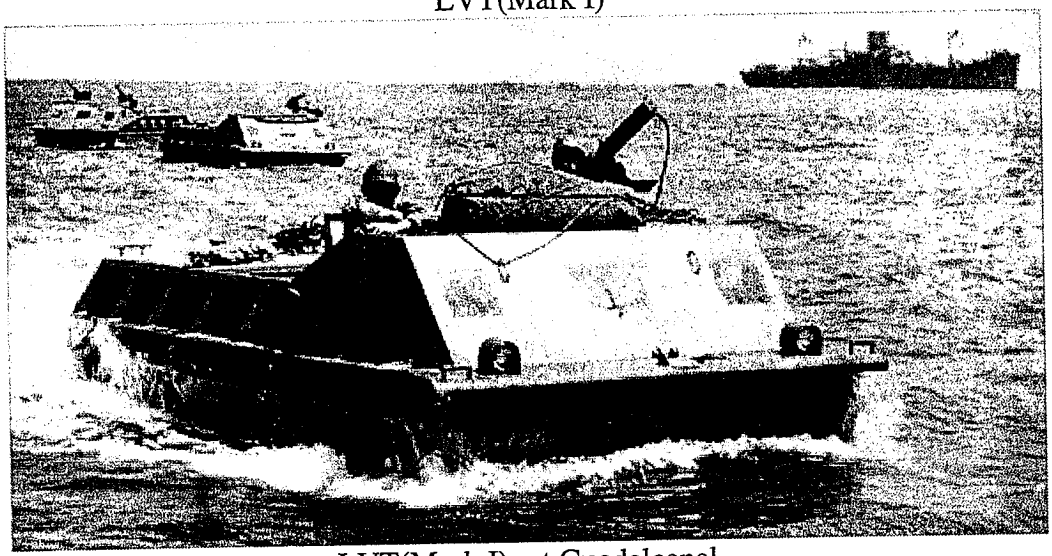
Okinawa: End of Organized Resistance[103]



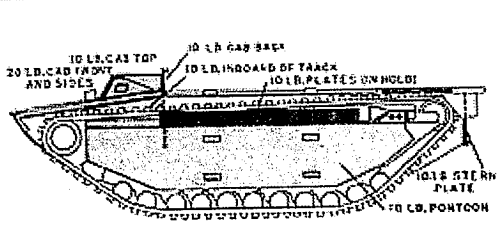
Appendix C: Amphibious Vehicles:

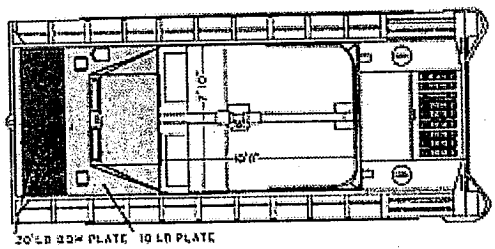
Landing Vehicle, Tracked (LVT)[104]

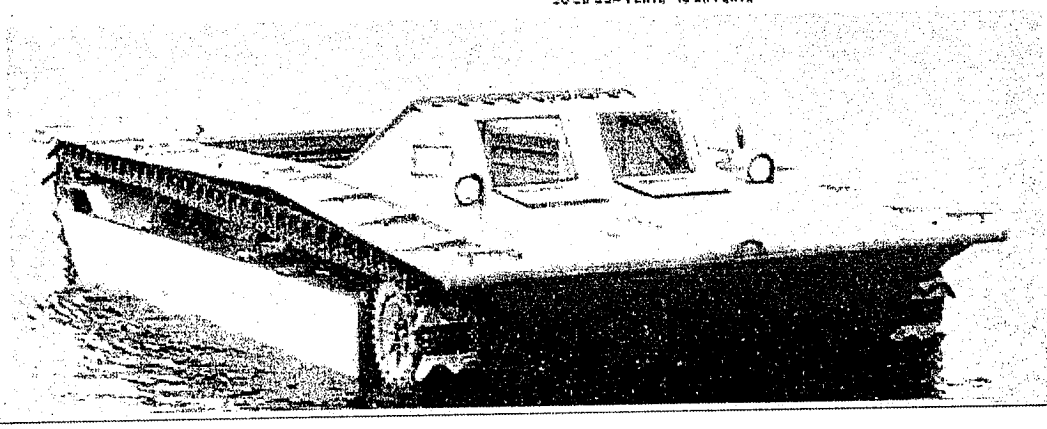
LVT(Mark I)

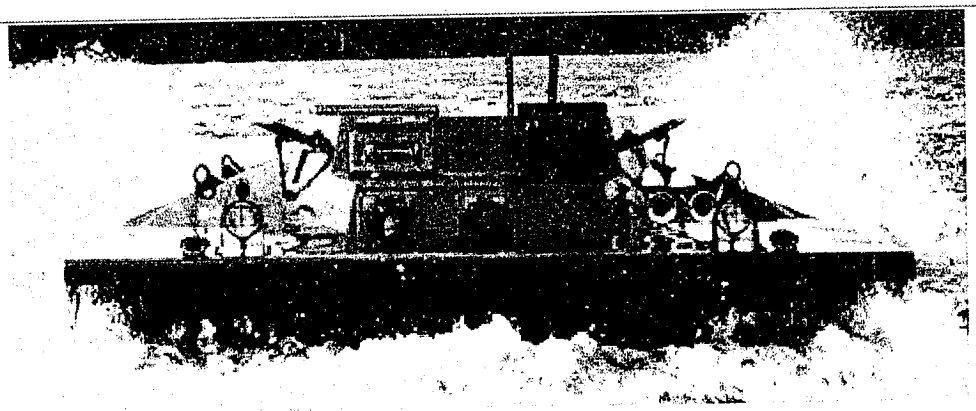


LVT(Mark I)s at Guadalcanal

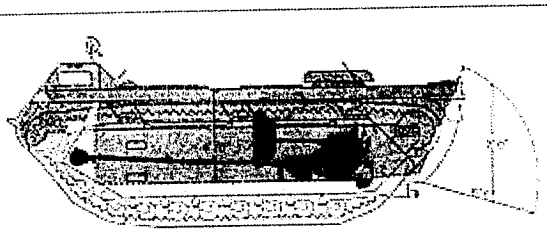


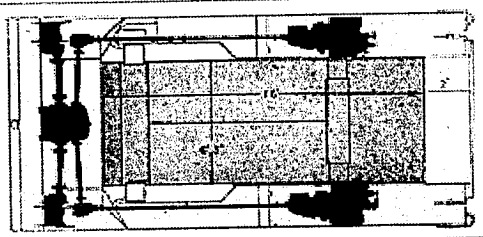


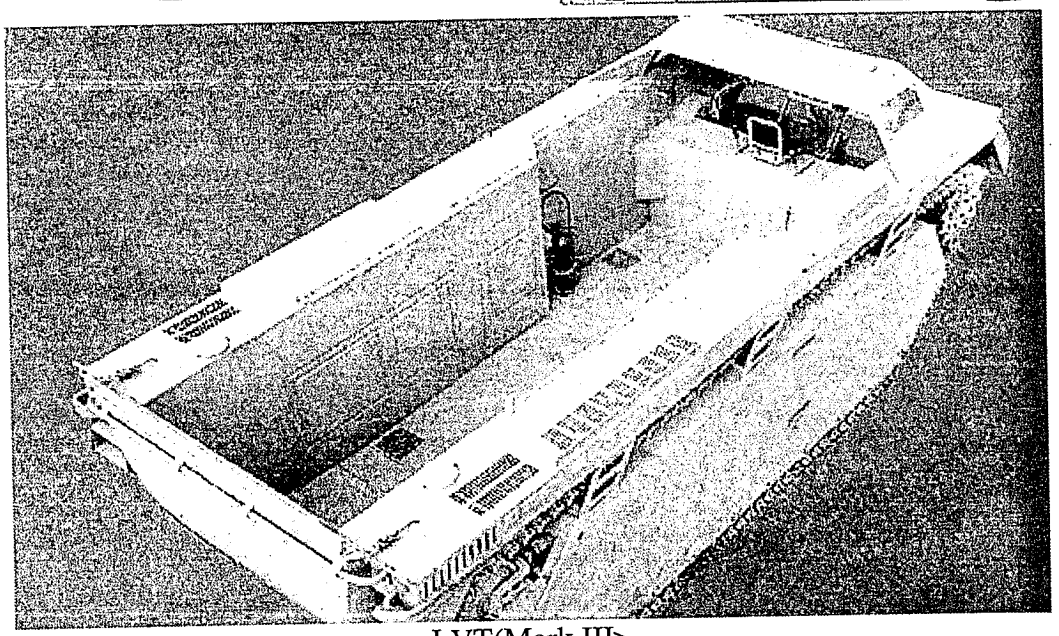




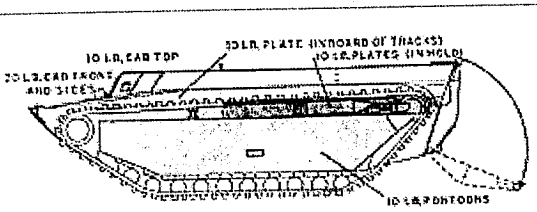
LVT(Mark II)

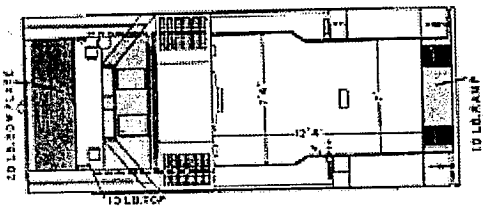


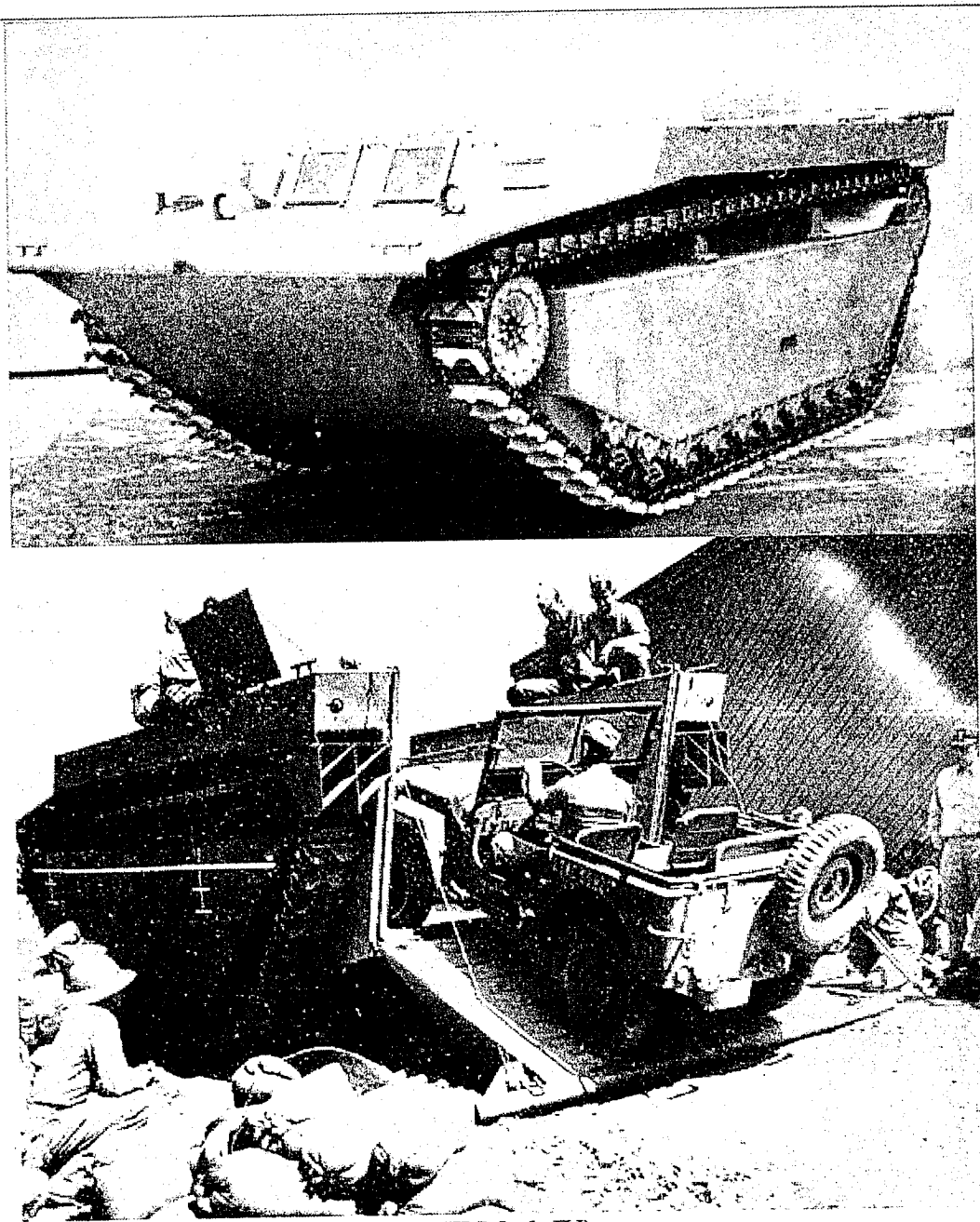




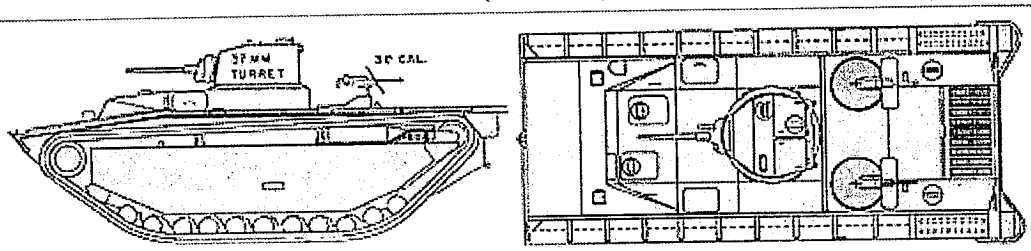
LVT(Mark III>

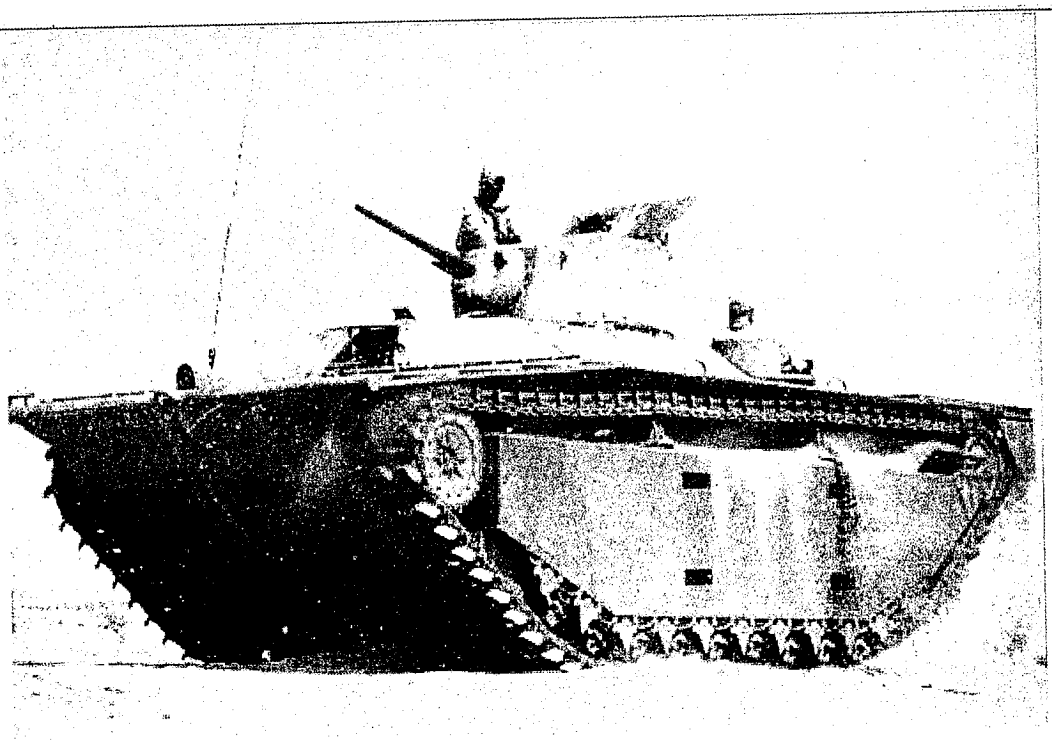




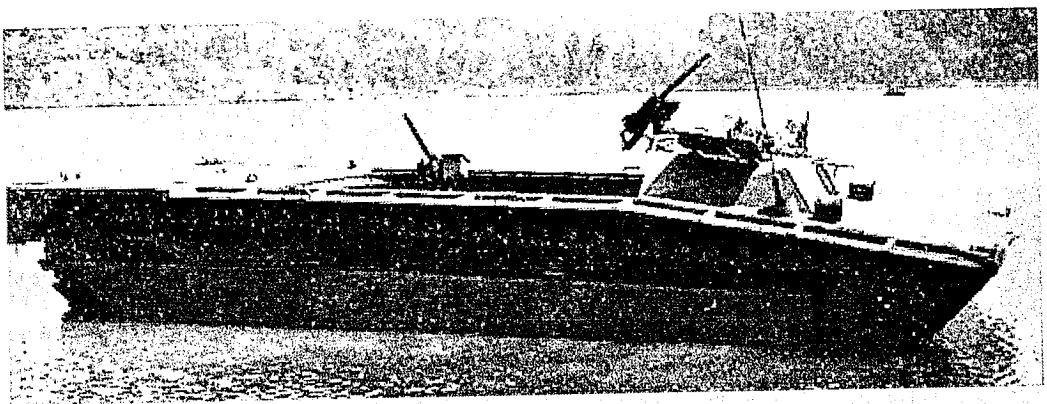


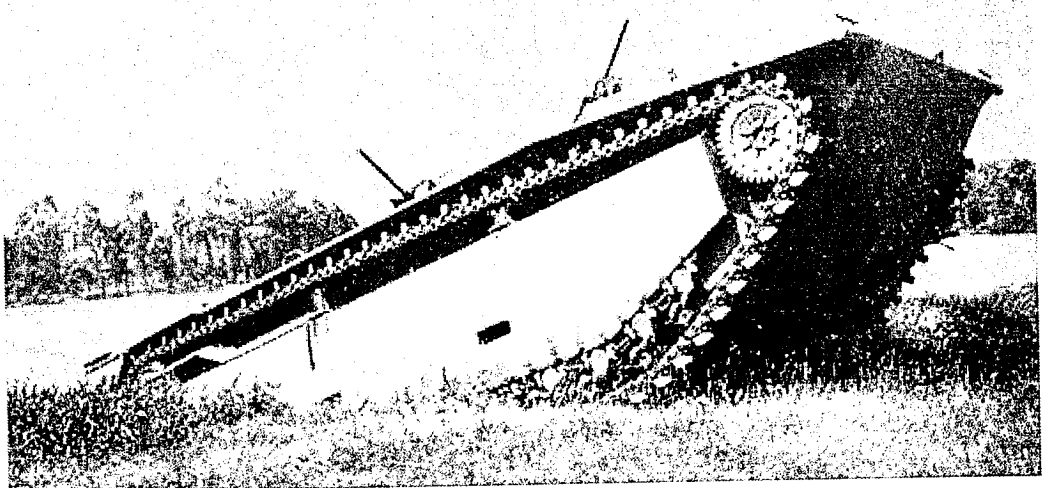
LVT(Mark IV)



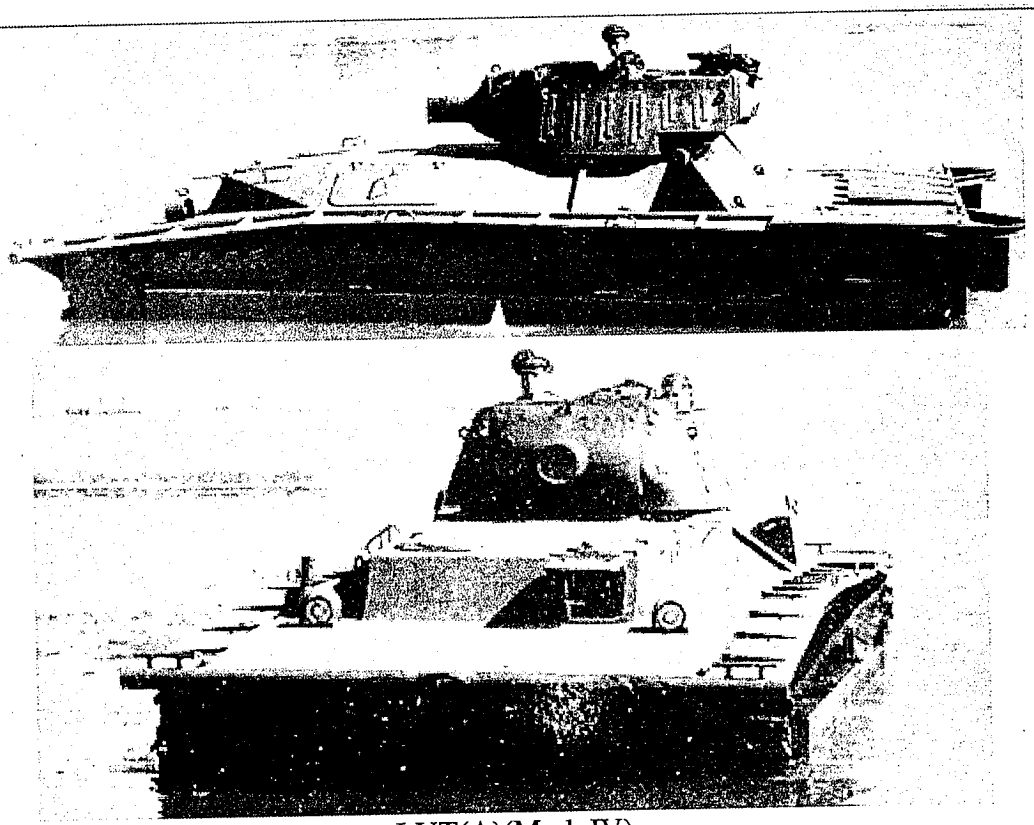


LVT(A)(Mark I)

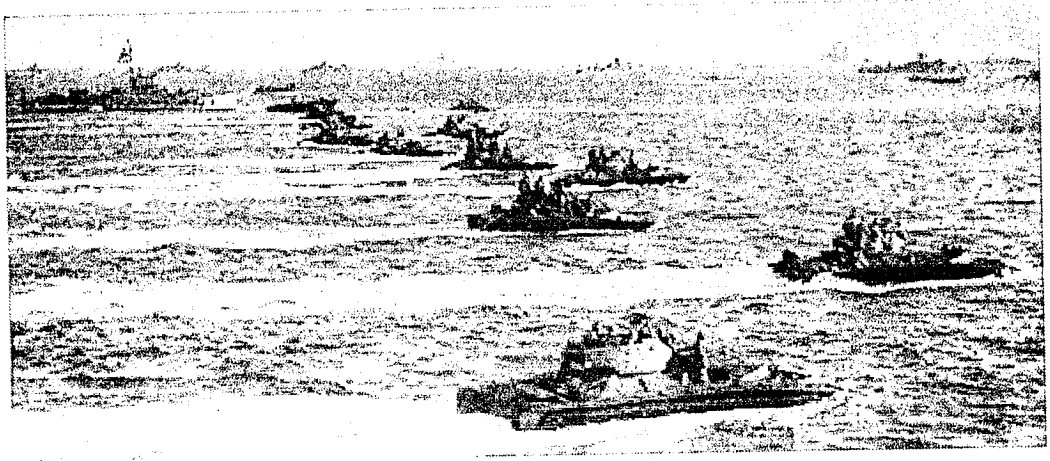




LVT(A)(Mark II)



LVT(A)(Mark IV)

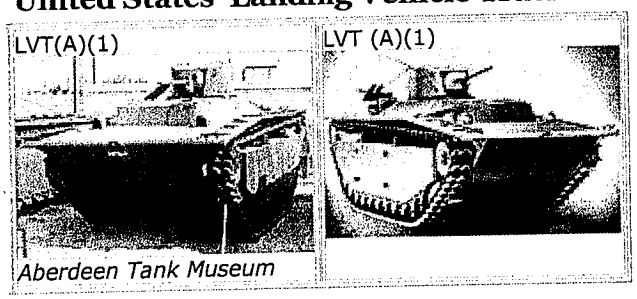


LVT(A)s heading for Okinawa

Note: LVTs were only utilized in the Pacific Theater of Operations (PTO). Pictures show both LVT and LVT(A) variants. LVT(A) variant was armored and equipped with weapons fulfilling the role as an amphibious tank able to deliver fires on the beach while transporting assault troops ashore.

Landing Vehicle, Tracked, Armored (LVT(A))[105]

United States' Landing Vehicle Tracked LVT(A)(1)



Aberdeen Tank Museum

Had a M3 light tank turret mounted.[1] Gun used a gyrostabilizer.[1] Also had "manholes" at rear with .30 cal MGs installed.[5] These were quite dangerous and were later removed.[5] There were periscopes for the crew to see out.[1] The engine was installed between the crew and the cargo compartment in the rear.[1]

When exiting the vehicle the passengers would have to go over the side as there were no doors in the back.[1] The 37 mm gun fired a 1.9 lb shell at a muzzle velocity of 2,900'/sec.[5] The Marines would replace the 37 mm gun with the E7 flamethrower.

Usage

First used at ROI-Namur in January 1943.[6] 75 were used.[6] Many of these were used at Bougainville and New Georgia.

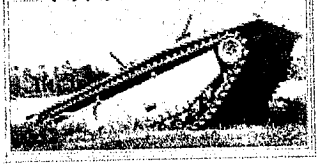
	LVT (A)(1)
Crew	3[1] (24 passengers)[1] 5[5]
Physical Characteristics	
Weight	30,000 lb[5], 32,800 lb 14.6 tons[1] 14,878 kg[1]
Length w/gun	26' 1"[1,5] 7.95 m[1]
Length w/o gun	
Height	8' 1"[5], 10' 1"[1] 3.01 m[1]
Width	10' 8"[1,5] 3.25 m[1]
Width over tracks	
Ground clearance	18"[5]
Ground contact length	126.5"[5]
Ground pressure	8.7 psi, 9.8 psi[5]
Turret ring diameter	
Armament	
Main	37 mm M3 37 mm[1] 37 mm M6, gyrostabilized[5]
Secondary	
MG	.50 cal AA, 2: .30 cal 12.7 mm (.50 cal) MG[1] 3: 7.62 mm (.30 cal) MG[1] 3: .30 cal M1919A4 MG, coaxial, ring mount by turret[5]
Side arms	
Quantity	

Main	104, 123[5]
Secondary	
MG	6,000, 6,500[5]
Side arms	
Armor Thickness (mm)	13[1]
Hull Front, Upper	0.5"@0°[5]
Hull Front, Lower	
Hull Sides, Upper	0.25"@0°[5]
Hull Sides, Lower	
Hull Rear	0.25"@0°[5]
Hull Top	
Hull Bottom	
Turret Front	1.75"@0°[5]
Turret Sides	1.25"@0°[5]
Turret Rear	
Turret Top	
Engine (Make / Model)	Continental W970-9A[1,5]
Bore / stroke	
Cooling	Air[5]
Cylinders	R-7[5]
Capacity	
Net HP	250[5]
Power to weight ratio	
Compression ratio	
Transmission (Type)	Synchromesh[5] 5 forward, 1 reverse[5]
Steering	Controlled differential[5]
Steering ratio	
Starter	
Electrical system	
Ignition	
Fuel (Type)	Gasoline[5]
Octane	
Quantity	140 gallons[5]
Road consumption	1 mpg[5]
Cross country consumption	
Performance	
Traverse	360°[5] Hydraulic Power or hand[5]
Max speed	20 mph[5], 25 mph[1] 40 kph[1] water: 7 mph[1], 7.5 mph[5], 11 kph[1]
Cross country speed	
Road radius	125-150 miles, 125 miles[1], 150 miles[5] 201 km[1] water: 50-75 miles, 75 miles[5]
Cross country radius	
Turning radius	

Elevation limits	-10° to +20°[5]
Fording depth	
Trench crossing	5'[5]
Vertical obstacle	3'[5]
Climbing ability	30° slope[5]
Suspension (Type)	Torsilastic springs[5]
Wheels each side	11 single bogie wheel assemblies[5]
Return rollers each side	2[5]
Tracks (Type)	Steel, twin chains with "W" shaped grousers[5]
Length	
Width	14.25"[5]
Diameter	
Number of links	73[5]
Pitch	4 1/8"[5]
Tire tread	Rubber[5]
Track centers/tread	113.5"[5]

United States' Landing Vehicle Tracked LVT (A)(2)

LVT(A)(2)



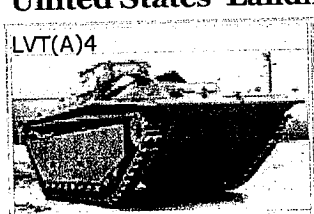
Similar to (2) but with armor plate. Called the "Water Buffalo". Carried 18 troops or a cargo of 5,900 lb[1] (2,041 kg[1]). 450 built by Roebling and Ford.

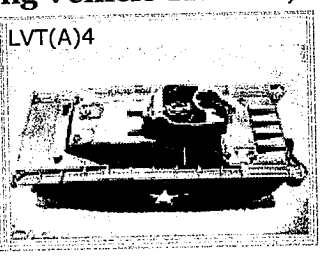
	LVT (A)(2)
Crew	3, 4[5]
Physical Characteristics	
Weight	32,000 lb, 32,200 lb[5]
Length w/gun	26' 1"[5], 26' 11"
Length w/o gun	
Height	8' 1"[5]
Width	10' 8"[5]
Width over tracks	
Ground clearance	18"[5]
Ground contact length	126.5"[5]
Ground pressure	9.8 psi[5]
Turret ring diameter	
Armament	
Main	.50 cal HB M2 MG[5]
Secondary	
MG	.30 cal M1919A4 MG[5] USMC: 3: .30 cal M1919A4 MG[5]

Side arms	
Quantity	
Main	
Secondary	
MG	
Side arms	
Armor Thickness (mm)	
Hull Front, Upper	0.5"@0°[5]
Hull Front, Lower	
Hull Sides, Upper	0.25"@0°[5]
Hull Sides, Lower	
Hull Rear	0.25"@0°[5]
Hull Top	
Hull Bottom	
Turret Front	
Turret Sides	
Turret Rear	
Turret Top	
Engine (Make / Model)	Wright W670 Continental W970-9A[5]
Bore / stroke	
Cooling	Air[5]
Cylinders	R-7[5]
Capacity	
Net HP	250[5]
Power to weight ratio	
Compression ratio	
Transmission (Type)	Synchromesh[5] 5 forward, 1 reverse[5]
Steering	Controlled differential[5]
Steering ratio	
Starter	
Electrical system	
Ignition	
Fuel (Type)	Gasoline[5]
Octane	
Quantity	104 gallons[5]
Road consumption	1 mpg[5]
Cross country consumption	
Performance	
Traverse	
Max speed	20 mph[5] water: 7.5 mph[5]
Cross country speed	
Road radius	150 miles[5] Water: 50 miles[5]
Cross country radius	
Turning radius	

Elevation limits	
Fording depth	
Trench crossing	5'[5]
Vertical obstacle	3'[5]
Climbing ability	30° slope[5]
Suspension (Type)	Torsilastic springs[5]
Wheels each side	11 single bogie wheel assemblies[5]
Return rollers each side	2[5]
Tracks (Type)	Steel, twin chains with "W" shaped grousers[5]
Length	
Width	14.25"[5]
Diameter	
Number of links	73[5]
Pitch	4 1/8"[5]
Tire tread	Rubber[5]
Track centers/tread	113.5"[5]

United States' Landing Vehicle Tracked, LVT (A)4


LVT(A)4


LVT(A)4

Aberdeen Tank Museum

Had open topped turret from M8 Motor Carriage.[5] Late in 1943 some had the Canadian built Ronson flamethrower replacing the 75 mm gun. The Marines also tried mounting T45 (2 banks of 10 rockets)[1] or T54 (20 183 mm rockets)[1] rocket launchers on its side.[1] The 75 mm howitzer fired a 18 lb HE shell at a muzzle velocity of 1,250'/sec.[5]

Usage

The LVT (A)(4) was first used at Saipan in June 1944.[6] It was primarily used by US Army and Marines in the Pacific.

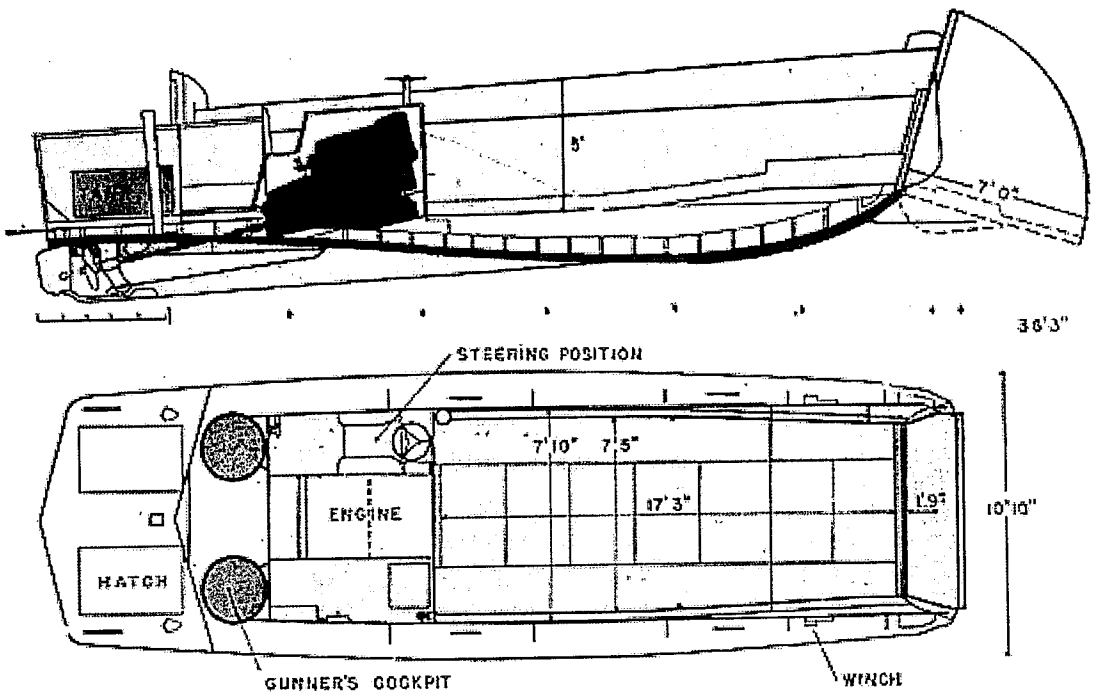
	LVT (A)(4)
Crew	6[1,5,6], (30 passengers)[1]
Physical Characteristics	
Weight	39,460 lb[5] 10.98 tons[1], 17.9 tons[6] 11,156 kg[1], 18,140 kg[6]
Length w/gun	26' 1"[6], 26' 2"[1,5] 7.9 m[1], 7.95 m[6]
Length w/o gun	
Height	10' 2"[6], 10' 2.5"[5], 10' 3"[1] 2.09 m[1], 3.1 m[6]
Width	10' 8"[1,5,6] 3.25 m[1,6]
Width over tracks	

Ground clearance	18"[5]
Ground contact length	126.5"[5]
Ground pressure	9.9 psi[5]
Turret ring diameter	
Armament	
Main	75 mm M2 or M3 75 mm[1] 75 mm Howitzer M3[5] 75 mm M2/M3 howitzer[6]
Secondary	
MG	.50 cal MG AA .50 cal HB M2 MG[5] 1: 12.7 mm / 0.5" MG[6] 3: .30 cal M1919A4 MG, bow, 2 in flexible mounts on each side of turret[5] 1: 7.62 mm / 0.3" MG[6]
Side arms	
Quantity	
Main	75[5], 100[6]
Secondary	
MG	400[6] .50 cal: 420[5] .30 cal: 6,000[5]
Side arms	
Armor Thickness (mm)	13[1], 44[6]
Hull Front, Upper	0.5"@0°[5]
Hull Front, Lower	
Hull Sides, Upper	0.25"@0°[5]
Hull Sides, Lower	
Hull Rear	0.25"@0°[5]
Hull Top	
Hull Bottom	
Turret Front	1.5"@0°[5]
Turret Sides	1"@0°[5]
Turret Rear	
Turret Top	
Engine (Make / Model)	Wright W670[1] Continental W670-9A[5,6]
Bore / stroke	
Cooling	Air[5,6]
Cylinders	R-7[5], Radial 7[6]
Capacity	
Net HP	250[5,6]
Power to weight ratio	
Compression ratio	
Transmission (Type)	Spicer synchromesh[5] 5 forward, 1 reverse[5]
Steering	Controlled differential[5]
Steering ratio	
Starter	
Electrical system	

Ignition	
Fuel (Type)	Gasoline[5,6]
Octane	
Quantity	140 gallons[5]
Road consumption	1 mpg[5] Water: 0.7 mpg[5]
Cross country consumption	
Performance	
Traverse	360°[5] Manual[5]
Max speed	20 mph[6], 25 mph[1,5] 32 kph[6], 40 kph[1] Water: 7 mph[5,6], 7.5 mph Water: 12 kph[6]
Cross country speed	
Road radius	150 miles[5,6], 300 miles[1] 240 km[6], 483 km[1] Water: 100 miles[5]
Cross country radius	
Turning radius	
Elevation limits	
Fording depth	
Trench crossing	5'[5]
Vertical obstacle	3'[5]
Climbing ability	30° slope[5]
Suspension (Type)	Torsilastic springs[5]
Wheels each side	11 single bogie wheel assemblies[5]
Return rollers each side	2[5]
Tracks (Type)	Steel, twin chains with "W" shaped grousers[5]
Length	
Width	14.25"[5]
Diameter	
Number of links	73[5]
Pitch	4 1/8"[5]
Tire tread	Rubber[5]
Track centers/tread	113.5"

Note: The LVT(A) was used extensively in the PTO, and transported assault troops ashore, while providing fires on the beach. Major General Holland M. Smith recommended that Marine and Army Divisions be supported with three battalions of LVTs (amphibious tractors) and one battalion of LVT(A)s (amphibious tanks) during assault operations.[106]

Landing Craft Vehicle, Personnel (LCVP)[107]



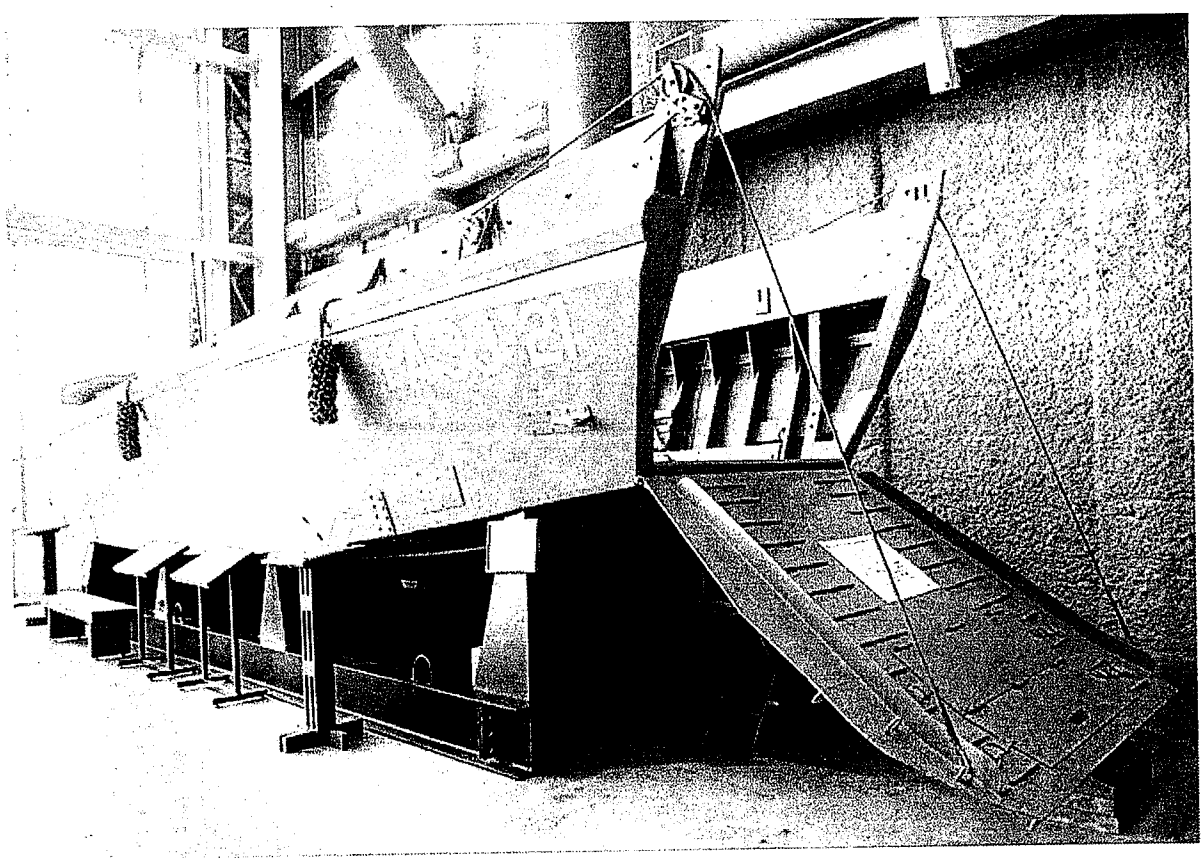


Photo # 26-G-2343 Army troops wade ashore on "Omaha" Beach, 6 June 1944

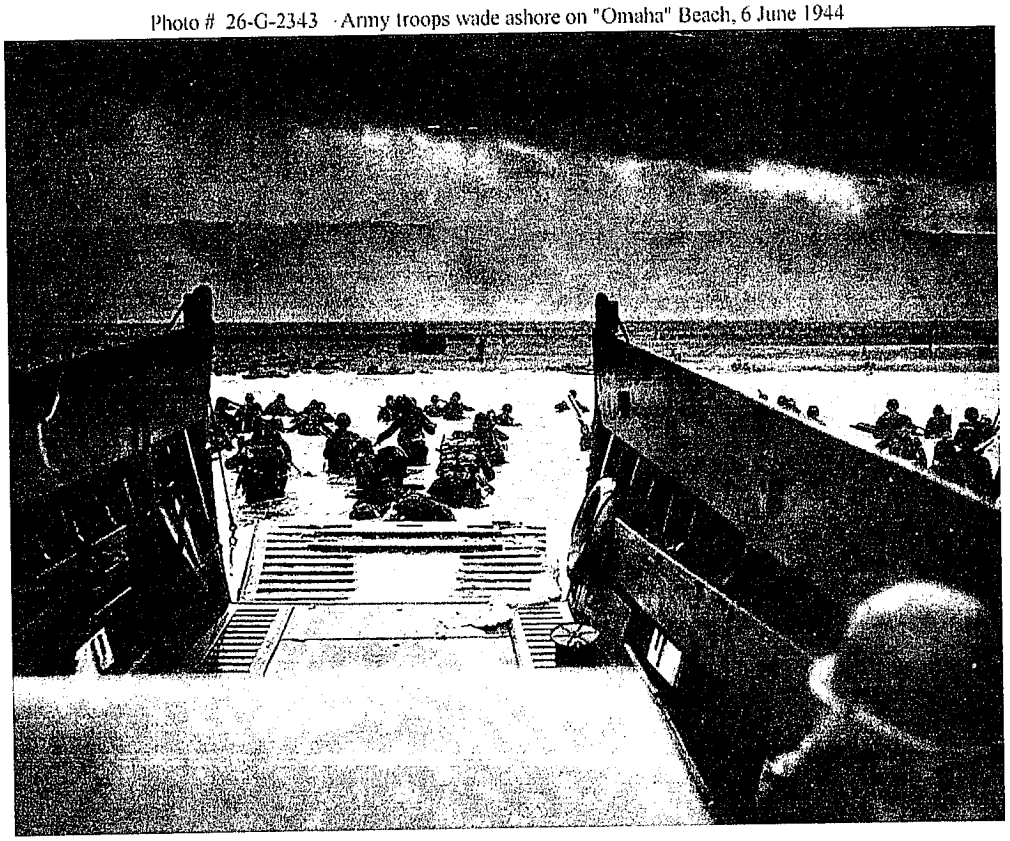
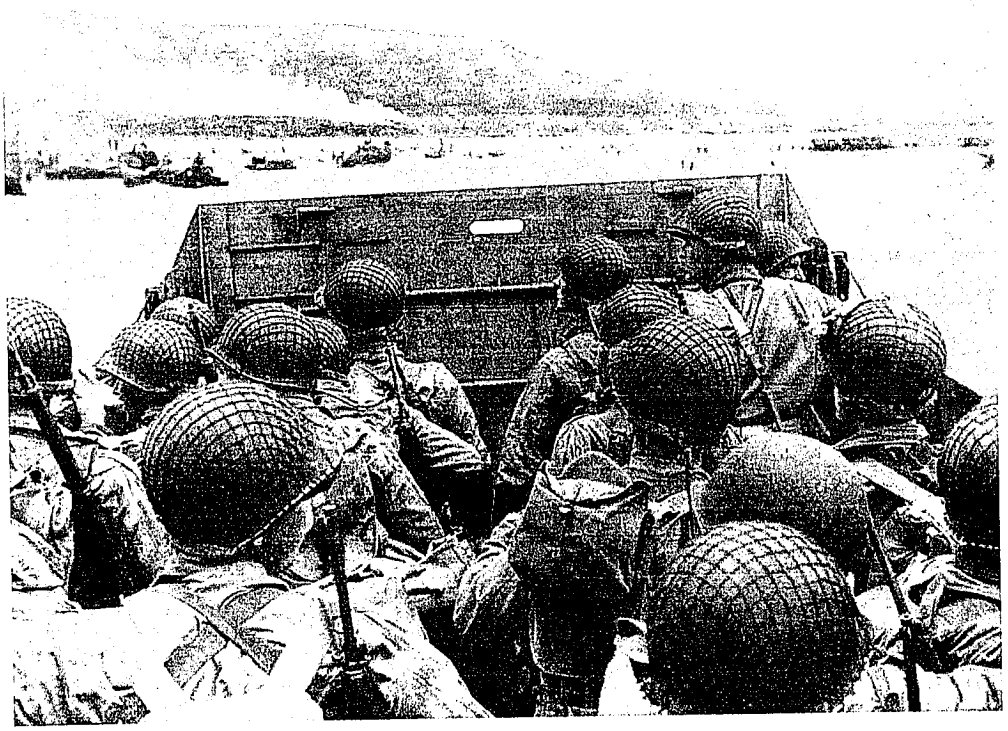
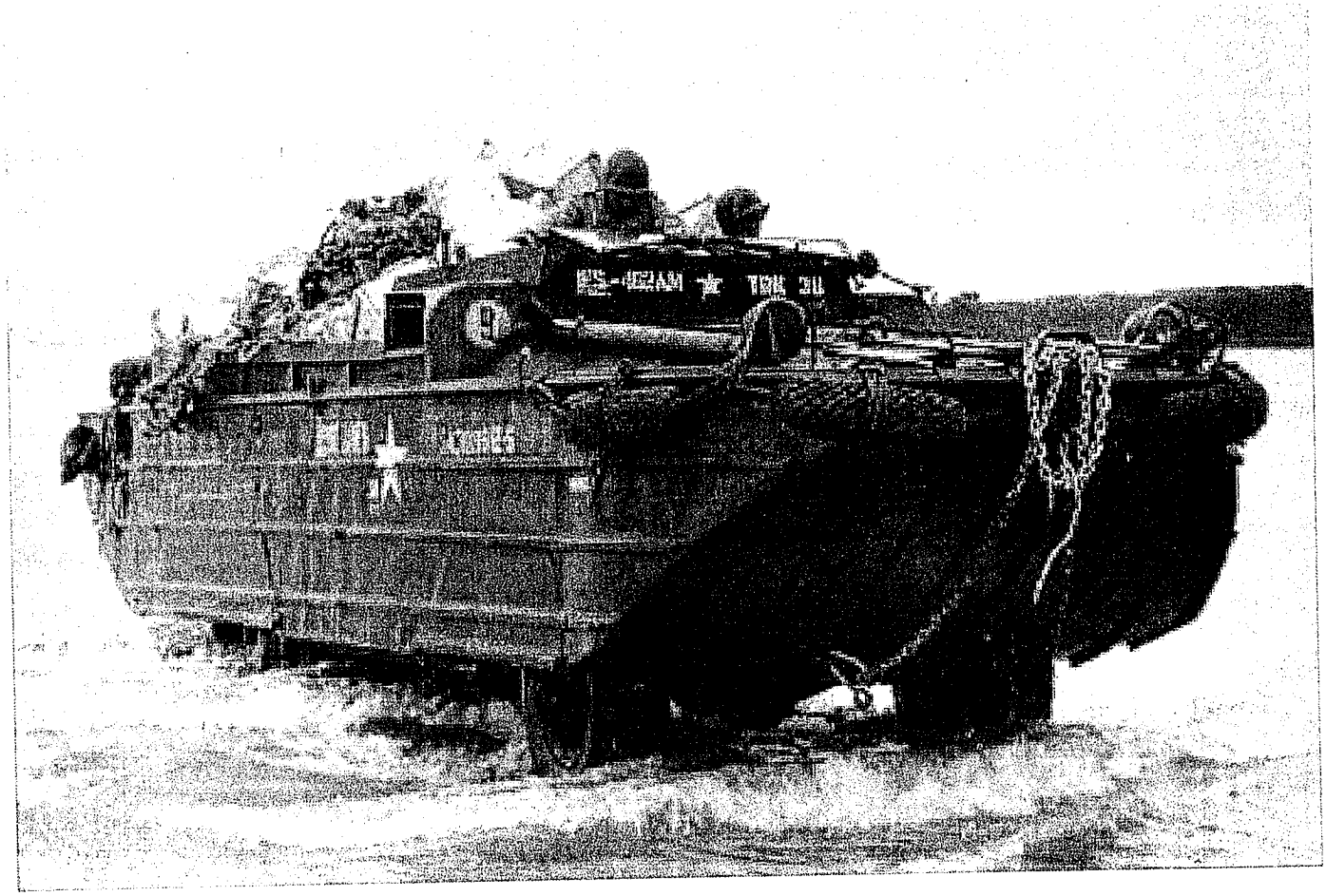


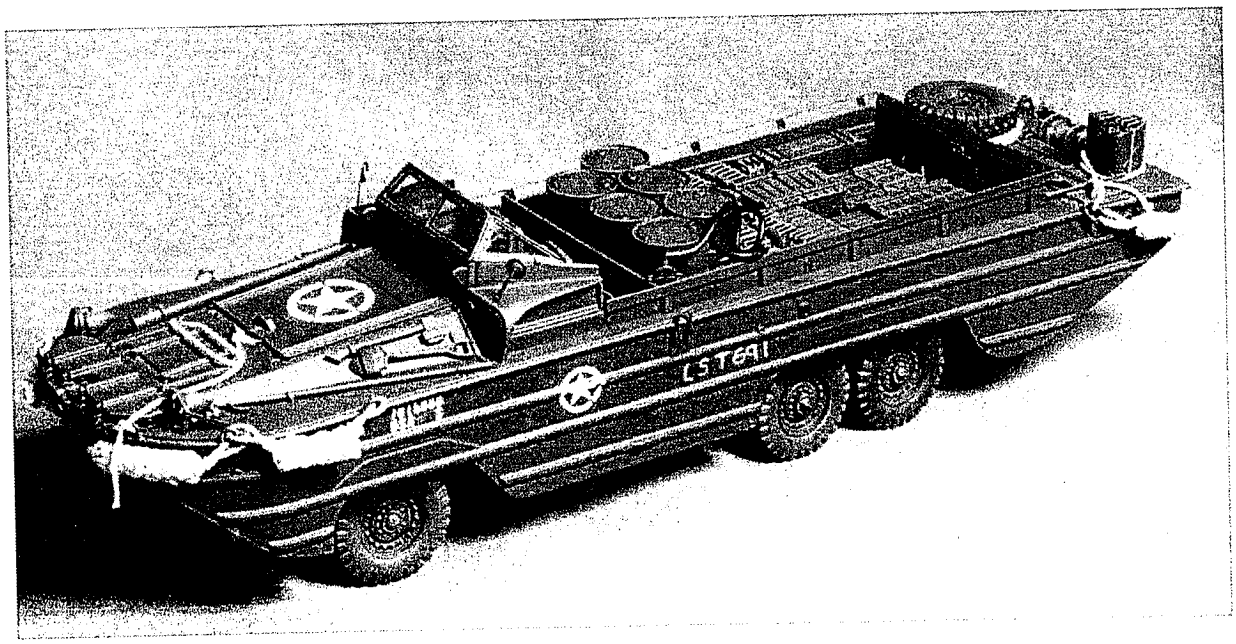
Photo # SC 320901 Troops in a LCVP approaching Omaha Beach, 6 June 1944



Note: LCVPs were used to carry the assault waves to the beach in the Eastern Theater of Operations (ETO). These two photos show LVCPs carrying troops ashore during the invasion of Normandy.

DUKW Amphibious Truck, 2 ½ Ton[108]





Note: Used predominately as a logistical vehicle in both the PTO and ETO during World War II.

Appendix D: Amphibious Training:

Fleet Landing Exercises, 1934-1941[109]

FLEX #	Year	Location	Comments
-	1934	Caribbean	Landing exercise; five days, little focus on debarkation and ship to shore movement. No naval gunfire.
1	1935	Culebra	Tested doctrine of 'Tentative Manual for Landing Operations', especially ship to shore movement, naval gunfire experiments, and air operations. Navy's boats inadequate. Naval gunfire focused on area bombardment, but need for armor-piercing shells not noted.
2	1936	Culebra	Shipping and landing craft needs re-appeared; command and control problems in darkness or under smoke. Naval gunfire and air operations problems still apparent.
3	1937	San Clemente	Problems identified included ship to shore movement, especially in rough surf; small boat and coxswain training problems; and naval gunfire and air operations ordnance, spotting, and communications. Positives: cargo nets used for debarkation, tactical radios (Army) improved communications, and 75mm pack howitzers functioned well; close air support at right angle to direction of supported troops so as to avoid fratricide.
4&5	1938&1939	Caribbean	Umpired landings at Vieques and Puerto Rico made against US Army defending force. Experience in handling supplies and medical evacuations. Deficiencies of small boats/landing craft again appeared, although boat crews more experienced. Naval gunfire: Navy began to revise area bombardment approach, i.e. point-target counter battery fire, plus special assigned ships for this role.
6	1940	Caribbean	Similar to previous ones; lack of amphibious ships for the landing force. Tested experimental landing craft.
7	1941	Caribbean	Five amphibious transports available, but lack of further shipping and landing craft limited realism of the exercise. Little naval gunfire or aviation support.

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Alexander, Joseph H. *Utmost Savagery: The Three Days of Tarawa.* Annapolis: Naval Institute Press, 1995. **Provided historical context on the operations on Tarawa, specifically the use of signal intelligence and ULTRA.**

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Gatchel, Theodore L. *At the Water's Edge: Defending Against the Modern Amphibious Assault.* Annapolis: Naval Institute Press, 1996. **Provides a detailed discussion of the three basic approaches to opposing an amphibious landing, as well as the operations on Tarawa and Okinawa.**

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[4] Miller, 1.

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[6] Kenneth J. Clifford, *Progress and Purpose: A Developmental History of the United States Marine Corps 1900-1970* (Washington: History and Museums Division, Headquarters, United States Marine Corps, 1973), 8-10.

[7] Clifford, 10.

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[9] Clifford, 30.

[10] Bittner, 119.

[11] Clifford, 30.

[12] Clifford, 36.

[13] Clifford, 36.

[14] Donald F. Bittner, "John H. Russell," *Commandants of the Marine Corps,* ed. Allan R. Millett and Jack Shulimson (Annapolis: Naval Institute Press, 2004), 240-243.

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[16] Clifford, 45.

[17] Isley, 35.

[18] Clifford, 46.

[19] Clifford, 47.

[20] Clifford, 47.

[21] Clifford, 35.

[22] Bittner, 133.

[23] Clifford, 48.

[24] Displays of the LCVP and LVT can be seen in the National Museum of the Marine Corps, Quantico, Virginia, and The National World War II Museum, New Orleans, Louisiana.

[25] The Central Pacific Drive implemented the original concepts inherent in War Plan Orange, while the South and Southwest Pacific offensives were deviations from the original plans for a Pacific war.

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[27] Henry I. Shaw, Jr., Bernard C. Nalty, and Edwin T. Turnbladh, *Central Pacific Drive: History of U.S. Operations in World War II* (Washington: Historical Branch, G-3 Division, Headquarters, U.S. Marine Corps, 1966), 28.

[28] Shaw, 38.

[29] Joseph H. Alexander, *Across the Reef: The Marine Assault of Tarawa* (Washington: History and Museums Division, Headquarters, U.S. Marine Corps, 1993), 3-4.

[30] Alexander, 4.

[31] Alexander, 26.

[32] Colonel Merritt A. Edson was the former Commander of 1st Raider Battalion and the 5th Marine Regiment during the Guadalcanal Campaign. Colonel Edson won the Medal of Honor and two Navy Crosses for his actions during World War II.

[33] Alexander, 34.

[34] Alexander, 34.

[35] Isley, 533.

[36] Isley, 535.

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[38] Isley, 540.

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[48] Shaw, 52.

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[50] Alexander, "Utmost Savagery," 70.

[51] Isley, 552-553.

[52] Gatchel, 156-157.

[53] Alexander, "Okinawa," 9.

[54] Alexander, "Okinawa," 9.

[55] Joseph H. Alexander, *The Final Campaign: Marines in the Victory on Okinawa* (Washington: History and Museums Division, Headquarters, U.S. Marine Corps, 1996), 9. Cited hereafter as Alexander, "Okinawa."

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[60] Donald M. Weller, "The Development of Naval Gunfire Support in World War Two," *Assault from the Sea*, ed. Merill L. Bartlett (Annapolis: Naval Institute Press, 1983), 267.

[61] Weller, 269.

[62] Heinl, 193.

[63] Shaw,110.

[64] 3d Amphibious Corps, "Okinawa After Action Report," 199.

[65] 3d Amphibious Corps, "Okinawa After Action Report," 199.

[66] Weller, 270.

[67] Weller, 270.

[68] Shaw, 113.

[69] Isley, 570.

[70] Shaw, 110.

[71] Shaw, 110.

[72] Holland M. Smith and Percy Finch, *Coral and Brass* (Washington: Zenger Publishing, 1979), 120.

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[74] Smith, 133.

[75] Shaw, 109.

[76] Isley, 575.

[77] For an example of logistical challenges in the Marianas Campaign, see. John D. Fleming, "Sustaining the Assaults on Tinian and Guam during the Marianas Campaign, 1944: A Historical Study of Logistics and Combat Service Support for 21st Century Amphibious Operations," (Masters Thesis, Marine Corps University, 2009).

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[79] Isley, 570.

[80] Frank, 70-72.

[81] Frank, 391.

[82] Shaw, 111-112.

[83] Isley, 250.

[84] Isley, 250.

[85] Isley, 250-251.

[86] Shaw, 112.

[87] Isley, 573.

[88] Isley, 573

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[90] U.S. Marine Corps, *Marine Corps Vision and Strategy 2025* (Washington: U.S. Marine Corps, 2008), 10.

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[92] Shaw, 33.

[93] Alexander, 6.

[94] Alexander, 35.

[95] Alexander, 35.

[96] Alexander, 43.

[97] Alexander, "Okinawa," 4.

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[107] Photo 1: Ibiblio.org, http://www.ibiblio.org/hyperwar/USN/ships/LCVP.html, (accessed January 20, 2010). Photo 2: Nationalww2museum.org, http://www.nationalww2museum.org/assets/images/higginsclose.jpg, (accessed 5 April 2010). Photo 3&4: Ibiblio.org, http://www.ibiblio.org/hyperwar/OnlineLibrary/photos/events/wwii-eur/normandy/nor4o.htm, (accessed 5 April 2010).

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[109] Bittner, 134. Table describes relevant focus of FLEX training and lessons learned.